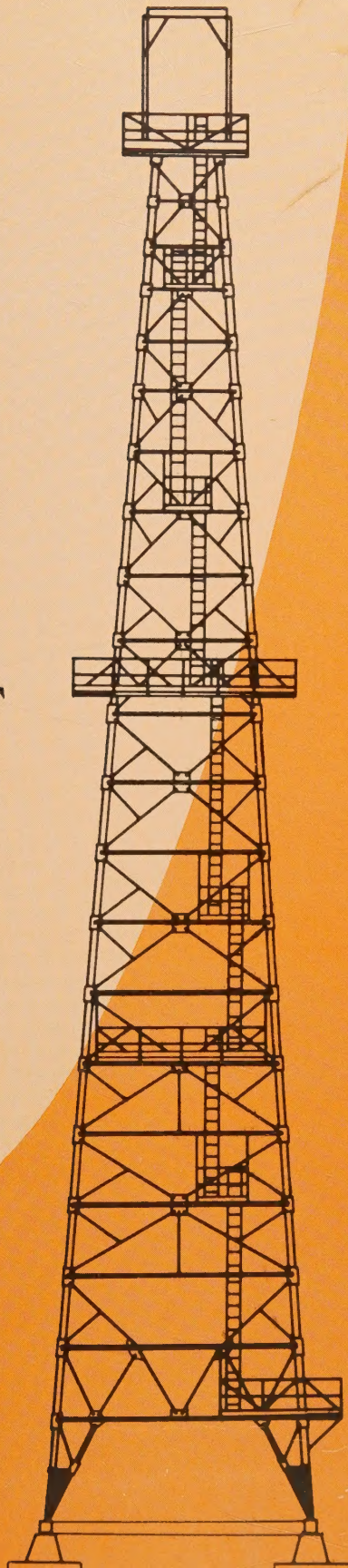


NOMAN KANAFANI

**OIL AND
DEVELOPMENT**
A CASE STUDY OF IRAQ

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Studies

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This preface is the only part of the present study which did not go through the endless process of seminar after seminar, so well known to all PhD students, at least at the Department of Economics at the University of Lund. I shall not use the space here, however, to "smuggle" back some of the original writings, for however exhausting and frustrating they were, these seminars never failed to improve the work.

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N.K.
Lund, June 1982

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ABBREVIATION

AAS	The Annual Abstract of Statistics (Republic of Iraq)
API	The American Petroleum Institute (measurement for oil gravity)
APOC	The Anglo-Persian (Iranian) Oil Company. Now The British Petroleum (BP)
b	billion (1000 million)
bbl	barrel. Every ton of crude oil of 36° API equals some 7.4 bbl.
BPC	The Basra Petroleum Company Ltd.
¢	cent, of the US dollar
CFP	Compagnie Française des Pétroles
CSO	Central Statistical Organization of Iraq
d	per day
DB	The Development Board
GDP	Gross Domestic Product (at factor cost)
ha	hectare
ID	Iraqi Dinar (equal to US \$ 3.38 in 1977)
in	inch
INOC	The Iraqi National Oil Company
IPC	The Iraqi Petroleum Company Ltd., or Group
Jersey	Standard Oil Company of New Jersey, Esso or Exxon
km	kilometer
m	million (1,000,000)
Mobil	The Standard Oil Company of New York
MPC	The Mosul Oil Company Ltd.
NI	National Income
ORCA	Ottoman Railway Company of Anatolia
RC	The Revolutionary Command Council of Iraq
sh	shilling of the GB pound
SoCal	Standard Oil Company of California
TPC	The Turkish Petroleum Company
t/y	ton per calendar year



1 INTRODUCTION AND SUMMARY

From the time of the oil price revolutions in the early 1970's and onwards, the oil producing and exporting countries have come to be looked upon as being a third, intermediate group between the developed and the underdeveloped countries. This view is based, at least for some, on the fact that the per-capita income in some of these countries is comparable to that prevailing in the most advanced Western economies. However, this claim is ill-founded. It is yet another example of the poverty of the statistical definition of underdevelopment, where a single quantitative index is given over-riding importance. Furthermore, it illustrates an unjustified tendency to ignore the highly complex process of transforming funds into productive capital formation, a tendency which the development literature seems to have inherited from the growth theory.

1.1 THE OIL ECONOMIES

The oil countries are a special sub-group in the underdeveloped world. Needless to say, these countries are presently quite better off than the rest with respect to the availability of funds in general and of foreign exchange in particular. Broadly speaking, four major features characterize the Middle Eastern oil exporting economies:

1) The crude oil producing and exporting sectors are disintegrated from the rest of the local economies. This may permit the use of the familiar conception of dualism. However, special caution should be exercised here, since the working mechanisms in the oil economies seem to tend to make the remaining non-oil sectors increasingly dependent on oil revenues. In other words, the dualism in the oil exporting economies is not between subsistence and the capitalist sectors with the familiar labor linkages between them, but rather between a sector that pumps a huge surplus into the economy and other sectors that refuse to respond. The connection, therefore, takes the form of a one-way flow of funds. Labor is being reallocated meanwhile, but only within the non-oil sectors, and often in favor of various service activities. Nor is the crude oil sector a "leading sector" with intensive backward and forward linkages. This type of interdependency does not exist. The dependency of the economy on the crude oil sector is strictly confined to the expenditure side.

2) Due to various legal restrictions, individuals in the oil countries can only own the surface of the land and not the resources under it. The governments of the oil countries became, therefore, the collectors of the oil revenues and were expected to work on two fronts: to improve the oil payment terms against the international oil cartel and the oil importers on the one hand, and to defuse the collected oil revenues into the economy on the other. Governments found themselves at the center of the economic activities, whether they liked it or not. Consequently, neither the ideological orientation nor the commitment to development of the various oil governments can be seen from the degree of their interference in the economic life. The type of expenditure policy adopted and the nature of the long-run goals must be of much more significance in this respect.

3) The oil revenues have provided governments with an "easy" source of finance and have released private income from the forced saving measures that can be seen in many other underdeveloped countries. To that effect, most of the oil economies are tax-free economies. Thanks to oil, the reciprocal relation between consumption and saving is less obvious here and, therefore, even if some form of planning is applied on the production side, the necessity for also planning the consumption side of the economy may not be fully appreciated. The huge surplus in the balance of payments makes such a one-sided policy possible, and various political considerations probably make it attractive as well.

4) Since almost all of the Middle Eastern oil countries are suffering from a small-sized market, limited and poorly qualified population, scarcity in other basic natural resources and from a number of social and political features which encumber the economy, the oil governments are finding it more and more difficult to get productive outlets for even a share of their oil revenues. This limitation on investment, which is due neither to a lack of funds nor to a balance of payment problem, has received little attention in the development literature. Yet this question is of fundamental importance when studying the oil economies. The limited capacity of the economies to absorb productive investment in the face of an almost unlimited flow of oil rent has resulted in a special type of expansion. For, certain expenditure outlets are favored more than others, because they are readily open and the government has more access to them. Yet, these outlets, if not in direct contrast to, are not always consistent with the long-term goals of the oil exporting countries.

The general economic goals of an oil producing and exporting country hardly differ from those of any other underdeveloped country. However, the means available for acquiring them are somewhat special in that an oil country possesses a natural resource, the extraction of which brings about a considerable surplus relative to its immediate cost. This state of affairs is further qualified by the fact that this resource has a limited long or short lifespan. The basic goal of an oil economy is to lay the foundation of an independent, self-sustained economy at a high level of development while its oil reserve is being depleted. Such a goal involves a twofold question:

1) to identify the rate and time at which the oil should be extracted from the ground. Once the oil prices are selected or given, the amount of oil revenue to be earned by the country concerned at various times will also be determined; 2) to specify how these revenues, among others, should best be allocated and utilized in order to achieve the general aims of the country in the shortest possible time.

1.2 THE HYPOTHESIS

This twofold question is dealt with separately in two distinct spheres in economic theory: economics of exhaustable resources and development economics. The underdeveloped oil countries have been unfortunate with respect to economic research. Somehow their situation has been lost between these two spheres of economic theory. Development economics excluded these countries because they did not fit into the alleged frame of poverty. The more the development textbooks stressed the scarcity of capital, the more the oil economies were excluded. The economics of exhaustable resources, on the other hand, a field which has only been flourishing in recent years, is designed basically to elaborate upon two complementary questions: to identify the characteristics of the optimal output and price time paths of an exhaustable asset and to determine the conditions under which the output of a reproducible good, for whose production an exhaustable resource is needed, can be maintained. These two problems seem to refer either to a profit-maximizing extractive firm or to an advanced economy utilizing natural resources in its productive process. The questions facing an underdeveloped oil exporting country that wishes to substitute a diversified productive base for its exhaustable resource, and for which oil is not an essential input but merely a commodity whose exportation brings in abundant funds, are not explicitly covered by the theory.

It may be thought that the determination of the oil output and price paths and, therefore, the revenues from oil in an optimization manner such as that

prescribed by the theory is a necessary first step for the latter step of allocating these oil revenues in a separate model. In such case, the planning process would be divided into two separate stages. The oil revenues would first be determined and then inserted in a macro-economic model of the national economy in order to decide upon the allocation of the oil revenues. The first model will ensure, therefore, that the oil country will earn the greatest possible total profit from its oil reserves. The second will in turn ensure that these revenues will be allocated and utilized in the best possible way so as to maximize a specific welfare function within a defined time horizon.

The present study is going to argue otherwise. Firstly, such a procedure institutionalizes the enclave stature of the oil sector in the economy and calls for two separate planning stages. The oil economies would, in fact, be relinquishing one of their basic economic planning advantages, namely the possibility of providing as much resources as needed. The logic of planning would be inversed when the countries seek outlets for a given amount of capital resources. This procedure would result in confusing the whole development planning mechanism, for it seems to take for granted that nothing limits the ability of the economy to absorb productive investment except the availability of funds. The two-stage planning approach assumes implicitly that the economy will be able to use productively whatever amounts of revenue that become available. The consequences of this claim on the performance of an oil economy, with reference to the Iraqi experience, will be presented later in the study. (C f chapters 4 and 5.) Secondly, the two-stage planning procedure also takes for granted that the theory of exhaustable resources is really capable of providing a clear-cut answer as to what are the optimal oil price and output time path in a fairly realistic world market. In fact, the theory has been unable so far to provide convincing solutions to a number of substantial methodological, theoretical and technical problems that it is facing. Many of these difficulties arise from the very peculiar nature of the exhaustable resource market in general and the oil market in particular. (C f chapter 6.) Thirdly, in contrast to what is often assumed, the inflow of oil revenues is not without cost to the oil exporting economies. I.e. the extraction of a barrel of oil from under the ground today does not merely imply that the possibility of extracting this barrel in the future has been lost. Whether because of the institutional constraints and short-run political considerations, or because of the structure of the international markets, or the psychological effects of the accumulated funds, the tendency of the oil governments to squander their assets seems to be a

function of their having revenues in excess to what can be productive utilized in the economy. The adoption of an "easy" expenditure policy by the oil rentier governments seemed to be about the only way to reconcile a strictly confined capacity in the local economies to absorb productive investment and an almost unlimited inflow of oil rent. Such an expenditure policy has extremely dangerous side effects on both the economic and socio-cultural fronts to the extent that the foundation of a real productive base may be seriously hampered. (C f chapter 8.)

Some of the disadvantages resulting from the two-stage planning approach can be alleviated to some extent, assuming that the oil country concerned has access to a special outlet, investment abroad, that would absorb all of the oil revenue that could not or should not be used internally. Investments abroad are, furthermore, supposed to be brought back at a later stage when the need for them arises and the internal conditions warrant it. Although it seems unrealistic to assume that the accumulation of funds abroad will not affect the internal expenditure policies adopted by an oil government, the proposition does have the merit of recognizing that there exists a limit on the amount of productive investment that can be undertaken internally at any specific time, and that this country cannot simply invest whatever amounts of funds it receives. However, since the oil countries are realizing more and more that their foreign portfolio is exposed to devaluations, expropriations and various political pressures, this proposition may turn out to be a second best choice only. (C f chapter 7.)

As much as the strict control over the inflowing oil revenue is vital for undertaking a meaningful planning within the individual oil producing country, it is also important for maintaining the relatively strong position held so far by OPEC in the international oil market. Throughout its history, OPEC has failed, however, to advance a generally accepted criterion by which a particular volume of oil output could be allocated among its various members. Two basic observations should be noted in this respect. Firstly, it seems ill-advised for OPEC to produce as much oil as it can market in order to take advantage of the favorable circumstances before an oil substitute is found or a more elastic oil demand develops. This sort of simple, short-run Marshallian analysis does not seem to fit the oil market. The oil countries have no fear of the future in this respect for, even if a perfect substitute for crude oil were found at a competitive price - which appears to be a very remote possibility indeed - no substitute for crude oil as input for the flourishing petrochemical industries can be found. Secondly, throughout the

history of the oil industry, oil prices have hardly even been determined in a competitive manner or in accordance with direct economic forces only. The size of the oil rent and its division among the oil producing countries, the international oil cartel and the oil consuming countries are also directed by other factors than those adhering strictly to the economic sphere, notably the whole international political scene and the state of power relations. The picture, therefore, as projected by the performance of the actual oil market, may appear somewhat surprising to the economist who is trained to consider only the direct economic factors. Somehow, the international scene seems to impose a certain minimum floor on the quantity of oil that OPEC "ought" to produce and/or a certain ceiling on how high oil prices can go. In such a setting, it seems that the best OPEC could do would be to force through its own minimum floor on the price of oil. Naturally, this cannot be done without control over the total quantity produced, which requires in turn the existence of a certain oil output allocation criterion among the various members of OPEC.

All of the above points to our central claim: that there appears to be no prior reason for an oil country to eagerly take advantage of the current oil prices. The country may be better off, in fact, if it produces as much oil as its "need" for revenue dictates, rather than to tend to spend as much revenue as it can get. The adoption of an oil production program based on internal needs as determined primarily by the absorptive capacity, provides a means of gaining firm control over the inflowing rent so as to minimize its negative effects and to allow its utilization in a way that will most efficiently advance the goals of the society.

There is hardly any reason to suppose, however, that the total amount of oil that the individual OPEC countries should produce, based on the "need" criterion, will correspond with the amount that OPEC "ought" to produce in order to attain and maintain a specific price level that it considers at that time to be "acceptable and possible". In the light of the present situation, it would appear that the latter quantity would be larger than the former. I.e., OPEC "ought" to produce more oil than is dictated by the need of its individual members for oil revenues. The required "surplus" oil output may well be allocated among the various OPEC members in accordance with the oil reserve volume or the oil productive capacity indices.

In such a context, the concept of "need", being central and important to our proposition, would have to be qualified and given somewhat clearly defined

dimensions. This will be attempted in both chapters 5 and 7 in this study. In chapter 7 a simplified illustrative model for Iraq will be presented. In the last chapter of the study, chapter 8, further light will be shed on our general proposition concerning a strategy for oil production.

1.3 THE CASE OF IRAQ

Although they can be logically grouped together, the Middle Eastern oil countries can also be split in accordance with various indices: e.g. the relative size of the population, the relative degree of dependency on oil revenues, the relative abundance of other vital natural resources and the nature of the economic philosophy adopted by the government. Of the countries that form this "lucky" group, Iraq emerges as one of the more fortunate. It has a rather large population that puts hardly any burden on the land; an economy in which crude oil export is its spinal column but not the whole of its body; a relatively rich water supply and extensive cultivated and potentially cultivable land; and finally, a clear-cut adoption of the central planning of its development efforts for which relatively able and experienced cadres are available. (In fact, Iraq was one of the first countries in the Third World to apply some sort of planning of its economic development.)

The choice of Iraq as a case study of the Middle Eastern oil economies has a number of advantages and disadvantages. It may be argued that the country is not typical of the group. However, this may well be one of the merits of our choice, for any alarming phenomena that show up here apply even more severely to the other countries. Reference will be made, however, to the other oil producing countries when considering the consequences of the inflow of oil rent. In fact, the theoretical part of the study, with its implications and policy suggestions, is of a generalized nature and is applicable to the other Middle Eastern oil countries as well.

Iraq's economy has been the subject of a number of studies and academic theses. During the period before the July revolution, several foreign experts were called in by the Development Board to work out a survey of the economy and to evaluate and propose investment programs. The studies of the IBRD (1952), Iversen et.al. (1954), Salter (1955) and Little (1956) are some notable examples. The problem of shortage of time-series data, even for the very primary and basic variables, was clear in all these studies. The few figures provided by UN agencies, although valuable at the time, were of a speculative type only. Later, a number of Iraqi researchers directed their efforts towards providing somewhat more reliable statistics. The

most outstanding work in this respect was done by Haseeb (1964), who provided the first somewhat reliable detailed estimate of the national income of Iraq for the period 1953 to 1961. Another notable study was that of Hashim (1970), who provided an evaluation of the gross capital formation in Iraq during the period from 1957 to 1962, later extended to 1970. Finally, a number of studies were made to evaluate the sectoral economic development of the country and the planning experience in general. Langley (1961), Hassan (1966) and Jalal (1972) are some examples. Some of the research studies presented planning models that took the specification of the Iraqi economy into consideration and aimed at overcoming some of the shortcomings that occurred in the actual performance. C f Al S`ady (1974) and Mahdi (1978).

These studies, along with a number of others, have supplied us with valuable insights and data concerning the Iraqi economy. Crude oil extraction and exportation were surely in the background of all of these studies, but, with only a few exceptions, none of the studies treated these aspects explicitly. Perhaps because the oil sector has until recently been under foreign control, none of the studies attempted to suggest any oil extraction program nor to trace the socio-cultural and economic consequences that were emerging as a result of the "easy" expenditure policy adopted by the government.

A few of the studies, however, had touched upon the question of the way in which oil revenues are pumped into the economy and the impacts they left (c f Al-Nasrawi, 1967), evaluated the planning technique and the plans' implementation (c f Mahdi, 1977), and analysed the overall development determinants (c f Sayigh, 1978b).

1.4 THE PLAN OF THE STUDY

The present work is divided into eight chapters. After this introductory chapter, the second will serve as a background and will be devoted to reviewing the history of the Iraqi oil concessions. An attempt will be made to answer such questions as the following: Why and how does the modern history of Iraq, if not of the whole Middle East, revolve around crude oil? How did the world oil market function and what mechanisms of control were being used by the oil companies? What was the root to the chronic problems existing between the companies and the Iraqi government? The emergence of OPEC in the early 1960's and the process by which the nationalization of all foreign oil interests was effected will also be reviewed. It is our belief that without a firm base in history, one cannot grasp what "oil" means

to the Arab people in general and to the Iraqi in particular.

The third chapter will be devoted to a presentation of the Iraqi economy, our particular field for this study. After presenting the general features of the country, the main landmarks of the three basic sectors in the economy will be reviewed, namely crude oil, agriculture and the industrial sectors. Special attention will be given to the role played by oil revenue in the economy. The evolution of the institutional nature of the means of production and the basic bottlenecks in the agricultural and industrial sectors will also be treated. Thereafter, we will shed some light on the state of income distribution in the country, and, finally, a few pages will be devoted to the political management of the Iraqi economy, an aspect that will be referred to frequently throughout the study.

The fourth chapter will be concerned with evaluating the development efforts in Iraq. The chapter will present and analyse, in some detail, various economic development plans, with respect both to formation techniques and implementation. Our central object here is to trace how oil revenues were allocated in the development plans and what the planners had seen as the major constraint on the size of investment that could be undertaken. The practiced procedure of allocating a fixed share of oil revenue to the development budget, which is taken in various studies to be a sign of a commitment to development, appears in our analysis as a severe constraint rather than as an advantage. Without planning how much oil revenue the country will receive, the procedure implies that the economy is capable of investing a certain fixed share of oil revenue, regardless of its actual size, i.e. the availability of funds is seen as being just about the only constraint on the size of investment that an economy can undertake.

In the fifth chapter we will elaborate on the concept of absorptive capacity and its determinants. As will be made clear later, the concept is understood in a fairly similar fashion in a number of different studies. A difference exists however in its measurement tool. The fact that absorptive capacity depends on non-measurable socio-political and cultural factors as well as purely economic ones imposes certain limitations on the use of the marginal efficiency of capital as a measure, let alone the technical difficulties that accompanied the use of that tool. The basic idea that will be stressed in the chapter is that a society is able to manipulate a specific maximum level of stream of local output at a specific time. For a given capital coefficient, this stream of local output could be equivalently

expressed by a specific maximum possible growth rate of total investment. The investment level that an economy is able to absorb at any given time becomes a function of the capital formation that was undertaken previously. The chapter will proceed thereafter, on the basis of a number of studies carried out within the socio-cultural approach and of our earlier review of Iraq's economy, to single out the main factors that seem to have played an essential role in determining the country's ability to invest.

In the sixth chapter we will turn to the theory of exhaustable resources in the hope that the theory will provide us with some guides as to how much a country such as Iraq should receive optimally of oil revenues. Before introducing the basic norms of the pure theory and the inevitable imperfections in the natural resources markets, we will investigate the concept of rent as delineated in the classic tradition, and as reinterpreted in the modern literature. The scarcity rent, which is roughly equivalent to the absolute rent in classic terminology, will be seen to be a substantial part of the equilibrium price of any exhaustable commodity, over and above the marginal cost. It ought to be stressed that this excess is not due to any market imperfection.

In the pure theory, the equilibrium price of oil (or the corresponding optimal rate of extraction) cannot be determined without forcing through a rather strong assumption (e.g. the exact time and cost of the emergence of a backstop technology). However, it is possible to state generally that if extraction is carried out in such a way as to allow the scarcity rent to increase exponentially at the interest rate, supposing that all the deposit under the ground will be extracted, then the resource will be used in an efficient manner. For a number of well-defined reasons, however, imperfection seems to be inevitable in the world oil markets. The basic norms of the exhaustion theory, limited as they may be, are nevertheless confined to the two extremes: perfect competitive and pure monopoly markets.

A number of models were developed in recent years to elaborate on a realistic world oil market in which OPEC acts as a price-leading cartel. The general aim was to identify the optimal oil prices and output policy that would maximize the net gain from OPEC's oil reserves. OPEC is thus treated as a unified monopoly body with an oil production strategy disintegrated from the rest of the local economies of its member countries. The chapter will point out the limitations of such procedures and will identify some of its major weaknesses.

In the seventh chapter we will first review critically a model designed to allocate an exogenously determined amount of oil revenue. Taking the present situation into account, such a procedure will almost certainly require the investment of a large sum of money abroad. This is either because the return on external investment will be higher or because future internal investment is hampered by the lack of foreign currency. The approach implies, in our view, a limited understanding of the absorptive capacity concept. It requires that investment abroad be highly mobile yet have relatively high returns and ignores all the risk factor connected with investment abroad. Furthermore, this method overlooks the very serious consequences that are provoked by the accumulation of foreign portfolio, on both the economic and the socio-political fronts in the local economy.

The chapter will then proceed to present and solve for a model aiming at determining the quantity of oil production in accordance with the internal requirements of the Iraqi economy for oil revenue. The model is an inter-temporal, multi-sectoral linear programming one, utilizing the optimal control technique. The aim here is not, however, to conclude a set of oil extraction levels against which the actual level can be compared. Our interest lies, in fact, in showing the possibility of applying the method in practice, and in following up the implications of the limited absorptive capacity and the measures required in order to ease the economy's dependency on oil.

As mentioned earlier, the generalization of this oil production policy proposition as an output allocation criterion in OPEC as a whole, assuming that the oil price is exogenously determined, may require that some of the oil countries produce more oil than can be justified by their "need". Under such circumstances, investment abroad may be considered. In that sense, the accumulation of a foreign portfolio may become a necessity, warranted by the overall international scene. In other words, it is a second best procedure if the oil countries are not able to produce just so much oil so as to meet their need for oil revenue.

The last chapter in the study will be divided into two sections. The first will be devoted to shedding some light on the economic and socio-cultural consequences of the inflow of oil rent. The uncontrolled and somewhat unlimited inflow of oil rent in the face of a strictly limited absorptive capacity seems to provoke a certain type of expansion and brings about certain effects which may seriously hinder the long-term prospects of the oil

economies. Hopefully, the review of some of these consequences will provide further justification for our central claim regarding the need to establish firm control over the inflowing oil rent. The second section in the last chapter will be concerned with presenting a somewhat better formulated proposition for an oil production strategy. The "need" principle will be further elaborated upon and further qualified.

Some years ago H. Mahdavy (1970) noted that "the basic problems of a raw material producing country are either not fully recognized or not seriously tackled". Much literature has appeared since then, but, alas, the situation has hardly improved. "Economics can never be a serious science on the plane of physics", J. Robinson wrote recently (1980), "but we can make it a great deal less frivolous than it is at present ... provided that we give up the search for grand general laws and are content to try to enquire how things happen". The present study will have achieved its aim if it manages to "recognize" and "seriously tackle" the problems of an oil rentier economy in the light of what has actually happened.

2 IRAQ'S OIL: A HISTORICAL BACKGROUND

INTRODUCTION

In the present chapter we will attempt to introduce Iraq's oil. It is our belief that without knowing something of the history of the industry in the area, it is almost impossible to grasp what "oil" means to the people of the Middle East. Oil is not merely a source of foreign exchange and of "wealth" in general. It is also, for the Arabs, a commodity which decides to a great extent their political and economic fate, as well as their relations with the West. Crude oil has dictated much of their past, and will most probably continue to decide much of their future. Some argue, it is true, that oil has brought more harm than good to the area, that without oil the area would have been less subject to foreign interference than it had been. It is in such terms that oil is thought of and it is within that context that the nationalization of oil can be understood.

After reviewing the circumstances under which the Iraqi oil concessions were awarded and the conditions under which the international oil companies were operating, we will take a glance at the successive financial arrangements made between Iraq and the concessionaire and at the type of problems that characterized their relations. Finally, the events and processes which led to the nationalization of the oil industry in Iraq in 1972 will be presented.

2.1 A MIDDLE EASTERN OIL CONCESSION

At the end of the last century, the ministers of the Sultan, Abel Hamed of Turkey, became a bit worried about the mysterious interest that the "foreigners" were showing in the so-called petroleum in the villayets of Baghdad and Mosul. A certain C.S. Gulbenkian was hired therefore to find out all the facts of the matter. When Gulbenkian delivered his report in 1890, entitled "The Potential of Oil Deposit in Mesopotamia", he hadn't expected to be so convincing that the Sultan would order the transfer of the oil bearing land to his own civil list. Mesopotamia, however, never became the private property of the royal family. Instead it began to write its own scenario, one of the most astonishing chapters in the history of oil.

Turkey, the sick man of Europe, was taking its last breath. Some people thought that oil was the fresh blood that would pump life back into the dry veins of the Ottoman Empire. History decided otherwise: oil was rather to be its death certificate. We now know that the industrial revolution was then in full swing. Oil was only its fuel, but it soon became its master. The Ottoman Empire was in no position to grasp the facts of the new world. It was swimming in a lake of petroleum but didn't know what to do with it, and in fact did not need it. Petroleum was a commodity of the new world to come, while the Empire was a symbol of an old world on its way out.

Those who believed that a little money in the right pocket could bring about a "fair" oil concession were a bit naive. Nevertheless, they were numerous, and members of the corrupted bureaucracy and the royal entourage made fortunes. The oil concession in Mesopotamia was to fall to those who would inherit the Empire. The identification of the inheritance was by no means a simple matter. It required a World War which, only later, was discovered to have been the "First".

2.1.1 THE EARLY ATTEMPTS

The intensive diplomatic efforts of the Germans has resulted in two historical visits by the Kaiser to Istanbul. The first visit came only one year after a German firm, the Ottoman Railway Company of Anatolia (ORCA) was granted a contract to bring the railway line to Ankara. The contract gave the company the right to exploit mineral deposits within a zone of 40 km. along the railway line, a right which was automatically abandoned when the Sultan transferred the land to his civil list.¹ The second visit of the Kaiser coincided with the effort to extend the railway line to Baghdad.

The British reaction came from the periphery. In 1901, W. D'Arcy, a British citizen who had made his fortune goldmining in Australia, managed to secure an oil concession in some 85% of the Persian territory.² The success of the Germans was just as remarkable. In 1903 the ORCA achieved its life's victory: the Baghdad Railway Contracts. Article no. 22 read:

The concessionaire may exploit mineral deposits discovered in a zone of 20 km wide on either side of the road bed by following the laws and regulations pertaining to the deposits but without these consisting of a privilege or a monopoly for him.³

The Germans had still more to be proud of. The agreement was reviewed a year later and the last limitation was eased. Furthermore, they were given a

special privilege for oil concessions in the villayets of Mosul and Baghdad.

For a time the British were forced to remain silent about this agreement, not only because of their own success in Persia, but also because of the Germans' threat to interfere in their as yet unsettled affairs with Egypt.⁴ To keep silent, however, did not mean to remain passive. The British worked on three fronts: neutralizing Russia by respecting her interest in northern Persia, establishing relations with the rulers of mid Arabia and the Gulf's western shores and encouraging D'Arcy and Royal Dutch Shell to speculate over the German contract.⁵

The revolution of the Young Turks in 1908, whose principal aim was to modernize Turkey, brought about a short-lived improvement in the Turkish-British relations. British interests founded thereafter the National Bank of Turkey with a board of directors that included a single non-British citizen - C.S. Gulbenkian.⁶ Gulbenkian was fully aware that neither railway nor banking was the issue. It was oil. Once again he was apparently convincing, as the National Bank registered a new company in London in 1911, the African & Eastern Concession Ltd.

By then the oil scene was virtually in total chaos. Somehow, four different companies were claiming to have "exclusive" oil concession over the very same area. Each of the claims was backed with a document, and each company claimed that all the other documents were "valueless pieces of paper". However, the partners in any possible future agreements had now emerged. Their previous experiences and plain good logic must have suggested that agreements pay far more than "destructive" competition. The future partners were waiting for a suitable intermediary and for the right occasion. The occasion was the more pressing. It came in the 1912-1914 British-German detente, known at the time as the Bethmann-Hollweg policy. The architect, on the other hand, was also waiting: Gulbenkian.

For Gulbenkian there were only four serious partners, the interests of whom should not be ignored: first of all, Gulbenkian himself; secondly, the National Bank of Turkey, representing the British interests; thirdly, the Deutsche Bank, the major owners of the ORCA's shares; and fourthly, the Anglo-Saxon Oil Company, a subsidiary of Shell. For no clear reason, D'Arcy's company in Persia, the Anglo-Persian Oil Company (APOC), was excluded, although it was one of those that claimed "exclusive" rights over the Turkish oil.

It was Gulbenkian's patient efforts and the partners' cooperation that brought about success. In October 1912, the name of the African & Eastern Concession Ltd. was changed to the Turkish Petroleum Co. (TPC), and its capital was increased from £ 50,000 to £ 80,000. The Deutsche Bank was given 25% of the shares for its "valueless option", the National Bank Ltd. 35% and Gulbenkian succeeded in passing 25% to the Anglo-Saxon Oil Co. while keeping 15% of the shares for himself.⁷ This time Gulbenkian proved to be wrong. He did not only underestimate the British weight and thus interests, but he also placed them in the wrong hands.

The British Royal Navy was around that time shifting towards liquid fuel and the admiralty, headed at that time by Winston Churchill, was getting more and more interested in securing a permanent oil supply. In May 1914, a bill was introduced to the House of Commons to allow the government to buy 51% of the D'Arcy Co.(APOC), worth £ 2 million. Two months before that, the Foreign Office called for a meeting in order to resettle the affairs of the TPC. Representatives of the British and German governments, as well as the companies concerned, signed a new contract known as the Foreign Office Agreement of 1914. The TPC's capital was again raised to £ 160,000, the National Bank was forced to withdraw and D'Arcy's APOC was brought in with as much as 50% of the shares.⁸ The Deutsche Bank and the Anglo-Saxon Oil Co. each retained 25% of the shares. Gulbenkian was granted a 5% non-voting share to be provided in equal parts from the shares of the APOC and the Anglo-Saxon Oil Co.

The restrictive feature aiming at precluding competitive rivalry in future concessions was most obvious in this new agreement. Article no 10 stated:

The three groups participating in the Turkish Petroleum Company shall give undertakings on their own behalf and on behalf of the companies associated with them not to be interested directly or indirectly in the production or manufacture of crude oil in the Ottoman Empire... otherwise than through T.P.C.⁹

The history of the oil industry, for a long time to come, would not violate this "golden rule".

We now know that this brittle settlement should be viewed as a mere postponement of the confrontation. The misjudgement of power, and the size of interest it warranted, required proof - a war - to replace speculation with hard facts. One important event was still to take place before the onset of the war. Under the various forms of pressure usually required in such affairs, the Turkish minister of finance submitted, on June 28th, 1914, a note to the British and German ambassadors. This note, loose as it was, was later

considered to be the documentation of the commitment of the Turkish government to the oil concession over Iraq's territories:

The Minister of Finance being substituted for the civil list with respect to petroleum resources discovered and to be discovered in the Villayets of Mosul and Baghdad, consent to lease those to the TPC and reserves to itself the right to determine hereafter its participation as well as the general conditions of the contract.¹⁰

Four weeks later, a royal assent was granted to the House of Commons bill for purchasing 51% of APOC's shares. Six days later the war was declared.

2.1.2 THE IRAQ PETROLEUM COMPANY (IPC)

The British started their military operations in southern Iraq as early as mid October 1914. By the end of the war they had come as far north as the outskirts of Mosul. Between these two dates, Russia, France and Great Britain divided the inherited territories among themselves. The Sykes-Picot agreement referred to the division between Britain and France of the Ottoman colonies east of the Mediterranean. Mr. Sykes and Mr. Picot colored certain areas on the map blue and declared them to be under French control. Other areas were colored red and fell to the British. Palestine was left brownish, where "there shall be established an international administration of which the form will be decided upon after consultation with Russia".¹¹

The Sykes-Picot agreement was a preliminary settlement. Towards the end of the war Britain was seeking a better deal. The TPC share holders were not color blind. They could see that blue encompassed the Mosul province. British diplomacy aimed then at recoloring the brown areas red and at recapturing northern Palestine and the Mosul province from France. The two aims were achieved, for which France was paid by a share in Iraq's oil, among other things.

Negotiations were conducted in the two years following the war, and sometimes on as high a level as Clemenceau and Lloyd George. By 1920, an overall settlement had been reached and on April 25th, the San-Remo oil agreement was signed. The agreement stated that Britain was to grant the French government at the current market rate, 25% of the net output of crude oil which His Majesty's Government might acquire from the Mesopotamian oil fields. Should a private oil company be in charge, France was to be granted 25% of its shares at a price similar to that paid by any other concern. In this case, native interests, governmental or private, should - if they wished - be

allowed to participate with up to 20% of the company's capital. Furthermore, the company was to be under permanent British control.¹² The shares of the TPC were thus redistributed as follows: 47.5% to the APOC, 22.5% to the Anglo-Saxon, 25% to France¹³ and 5% to Mr. 5 per cent, Gulbenkian.

Not even this agreement was to last. True, Britain managed to eliminate the German oil interests from the region, satisfying British interests and ensuring French approval, but Britain failed to take into account the interests of a newcomer: the American. It was probably no mere coincidence that panic regarding possible shortages of US oil reserves broke out just around this time. The panic climate provided American diplomacy with needed public support for working towards giving American interests a foothold in Iraq's oil. The Americans, however, made the question a matter of principle. They saw the San-Remo agreement as being a violation of the "open door" policy, a policy which was interpreted to mean "the freedom for any company to obtain without discrimination, oil concessions in mandate areas, particularly in Mesopotamia".¹⁴ The US was in fact openly against the San-Remo agreement because it saw it as a "threat to its share in the international oil trade".¹⁵

Correspondence between the British Foreign Office and the American State Department in connection with this issue started in 1921. On November 20th, the American ambassador to London delivered to Lord Curzon a "dart note" informing him of the very bad impression that Britain's oil policy had left on American public opinion. Britain was to acknowledge that the San-Remo agreement violated the mandates' commercial principle as well as the British pledge that "the natural resources of Mesopotamia are to be secured to the people of Mesopotamia". Furthermore, this policy reflected the ex-parte judgement of the validity of the TPC concession and ignored American interests.¹⁶

The answer of Lord Curzon gives the impression that he did not grasp very well the new facts on the world scene. He argued that the American share of the world's oil was predominant. For, while Britain controlled 4.5% of the world oil output, the US controlled more than 80%. He pointed out cases where American oil companies were backed by their government against British interests. "In any case", Lord Curzon proceeded, "the resources of Iraq would belong not to Britain but to the future state to be founded there".¹⁷ British diplomacy, clever as it was, could not of course bring about success in this matter. In November 1921, under the supervision of the Secretary of Commerce Herbert Hoover, the seven largest American oil companies formed a syndicate to represent American oil interests in the Middle East.¹⁸ The negotiations

between the American companies and the TPC lasted for six years, during which Iraq was made a constitutional kingdom and the TPC was granted the oil concession. The six years were not wasted on discussing whether or not to admit the Americans into the TPC. This was a closed matter. Questions such as how much should the Americans acquire, the commercial nature of the TPC and the fate of article no. 10 of the 1914 agreement which imposed the self-denying principle on TPC shareholders were on the agenda. The Americans were strongly opposed to the self-denying principle because it contradicted, in obvious ways, their "open door" policy on the one hand, and confined the future expansion of American oil interests in the Middle East to the expansion of the TPC itself, on the other hand.

The events of October 15th, 1927, when the Iraqi crude oil proved to be even better than expected, must have helped them to reach an agreement. On that date, the "black gold" blew up with extreme violence, shooting up a jet that could be seen 12 miles away, killing two workers and destroying all control equipment. This took place in the Baba-Karker oil field, north of Kirkuk in the northern province of Iraq.

An agreement was then reached. As the Americans had wished, the TPC was given the status of a non-profitable crude oil producing company. But contrary to the American's wish, the self-denying principle was enforced. The shares of the TPC were distributed in the following fashion, a division that lasted as long as Iraq's oil concession lasted: 23.75% each to the APOC, the Anglo-Saxon, the French interests (CFP) and the American interests (the Near East Development Corporation). Gulbenkian kept his 5%. The APOC was to take 10% free (reduced to 7.5% in 1931) of the TPC's output as compensation.

Before settling the affairs of the TPC, the British government settled political matters in Iraq. Appointing Feisal I as King of Iraq solved two of its immediate problems: finding a form of accepted rule in the country and fulfilling its promise to find a kingdom for Feisal after his expulsion from Syria by the French. There are, however, many reasons for believing that the foundation of the state of Iraq was conditioned by the granting of the oil concession to the TPC. In March 1925, as yet without a parliament, the British-appointed Iraqi government ratified the oil concession with the TPC.¹⁹

Iraq had to wait another 10 years to witness the first complete oil export year. During this rather long interval, the TPC's name was understandably changed, in 1929, to the Iraq Petroleum Company Ltd. (IPC). The IPC negotiated a new agreement with the Iraqi government in 1931 and relinquished

the north-eastern and the southern provinces of the country. The Iraqi government granted an oil concession to the British Oil Development Co., on some 41,302 square miles of the relinquished land west of the Tigris. The new concession was granted in April 1931, and was thought to have "provided, a priori, for more favorable terms to the Iraqi Government",²⁰ than those of the IPC.

The British Oil Development Co, under mysterious circumstances, failed to exploit her concession. By 1937 the IPC was in actual control over it, after having bought its Italian and German shares through an American agent. In 1941 the IPC founded a 100% associate company to handle this concession: the Mosul Petroleum Co.Ltd. (MPC).

In the late 1930's, when oil deposits were expected to exist in the southern provinces as well, especially since oil had been discovered in Kuwait, another 75 year oil concession covering all the Iraqi land not yet allocated was extended. This time the Iraqi government had learned its lesson and it granted the concession directly to the IPC. The IPC founded another associate, the Basra Petroleum Co.Ltd. (BPC), to exploit the contract. The executive president of the IPC "explained" this domination by stating flatly that "Competition for oil in Iraq was not economically sound".²¹

Finally, the IPC had full control over all of Iraq's oil, and only then was the actual development of the industry thought of.²²

2.1.3 THE RED LINE AGREEMENT AND THE INTERNATIONAL OIL CARTEL

As mentioned earlier, some of the TPC shareholders were insisting on retaining the self-denying principle as a condition for allowing American entry into the company. Since they were unable to compete individually, and were afraid that production from the Iraqi fields would be kept down once some of the TPC shareholders won exclusive oil concessions elsewhere in the area, that condition was vital to the weak members in the TPC. The famous Red Line agreement, which was signed in 1928 simultaneously with the admittance of the Americans in the TPC, was to ensure the self-denying condition among the company's shareholders. The agreement simply stated that no TPC shareholder was to have any oil interest, except through the TPC, within an area encircled by a red pen around all the eastern Arab countries that were colonized by Turkey (Kuwait and Egypt were excluded).

The Americans' reluctance to sign the Red Line agreement proved to be justi-

fied, as were the expectations of those who insisted on signing it. As long as all of those who were, or were to become, interested in the Middle Eastern oil were not included in the self-denying principle, the Red-Line would handicap the manoeuvring abilities of those who did sign it.

Less than two months after signing the Red-Line agreement, the heads of Jersey, APOC and Shell gathered and signed the Achriacarny Agreement, better known as the "As Is" agreement.²³ This was the first of four agreements among the major international oil companies which resulted in establishing the longest lasting, most powerful and efficient and the best organized cartel the world has even known.

The As Is agreement contained seven provisions: maintaining its participants' shares in the world market, sharing the existing facilities among themselves, adding new facilities only when needed, protecting the advantages of each producing location, preventing any price violations, marketing in the nearest market to the production field and eliminating all that might increase cost or decrease the demand for oil. After signing, the three founders sought the approval of the other major oil companies. Six of the international oil companies, known now as the "Seven Sisters", became involved. Three detailed agreements were made thereafter: the Memorandum of European Markets (June 1930), the Heads of Agreement for Distribution (December 1932), and the Draft Memorandum of Principles (June 1934). Two permanent Secretaries were founded, one to supervise supply regulations and the other to regulate distribution. Every single detail concerning oil production and marketing, on the world, regional and individual country levels, was thought of. The cartel, for example, did not only determine the way in which the profit earned by one of its members due to overmarketing should be shared, but also the way the extra profit resulting from the decline in total production cost due to that overtrading should be distributed among its members. The cartel's members were interrelated through long-term oil deals involving annual deliveries of huge quantities of crude oil. This was one of the major means of assuring each member of the commitment of the others.

In such a setting, the international oil market proved to be extremely sensitive to any uncontrolled oil portion supplied by the so-called independent producers. This kind of irritation on the part of the outsiders appeared at least twice. The first time was after the entry of SoCal into Saudi Arabia, which finally resulted in eliminating the Red-Line agreement and in making SoCal an "insider". The second was caused by the entry of the smaller in-

dependent American oil companies into Libya in the early 1960's.

It was SoCal rather than the IPC who succeeded in getting the two oil concessions of the Bahrain island and of Saudi Arabia. Some thought that SoCal won because "the IPC directors were slow and cautious in their offers and would speak only of rupees when gold was demanded".²⁴ SoCal, however, discovered oil in both concessions in 1932 and 1939 respectively. The two American members of the IPC, i.e. Jersey and Mobil, were in great pain to participate with SoCal in the Saudi concession. This was because of the apparently high prospects of that concession as well as because SoCal had had no marketing facilities and there was consequently a threat of an outbreak of a price war. The Red-Line agreement was the major obstacle that prevented Jersey Mobil from fulfilling this wish. The situation was eased for a while when SoCal cooperated with Texaco and started utilizing its distribution facilities east of the Suez. But this arrangement soon proved to be insufficient for containing the Saudi crude oil output and distribution west of the Suez was badly needed.

The three majors in the IPC, i.e. the Americans, the British and the British-Dutch, were struggling for more than seven years to ease the restrictions placed on their individual movements in the Middle East. The resistance of the French and of Gulbenkian was firm. In its turn, SoCal was facing a choice: either to compete to win markets for the ever-increasing Saudi production, or to admit entry to other American companies that possessed marketing facilities. The latter alternative proved to be the more attractive one.

The Second World War provided the three majors in the IPC with a long-awaited opportunity for putting an unilateral end to the Red-Line agreement. Thereafter, 30% of the shares of the Saudi concession went to Jersey and 10% to Mobil. Aramco's oil prices were soon tied to the world market prices.

After the war, France was in much too weak a condition for its objections to be feared. It did not take long before it approved the end to that agreement. In return, France was promised the speed-up in the reconstruction of the Iraqi fields and more oil than her pro-rate share, at special prices. Settling the matter with Gulbenkian proved to be much more difficult. But after one and a half years of hard negotiations, he accepted a compensation of 3,750,000 t/y of crude oil for 14 years. For 5% of this quantity he would pay the cost price and for the rest an average price.²⁵ In November 1948, the overall agreement was signed, all suits were withdrawn and the oil partners were reconciliated. From this point on, the Red-Line agreement

became mere history. As would the IPC.

2.2 IRAQ-IPC:TERMS OF AGREEMENT AND SOURCES OF CONFLICTS

The history of the Middle Eastern oil contracts, if looked at from the point of view of government oil receipts, can be classified in four stages: 1) the period when government oil revenues were linked to the profit earned by the oil companies, as was the case in the first Middle Eastern oil concession in 1901 in Persia; 2) the period that ended in the early 1950's, during which government revenues were linked to the tonnage exported; 3) the 50/50 profit-sharing period between producing companies and governments; and 4) the period when government revenues were calculated on the basis of its ownership of certain shares of the producing companies. Each of these patterns of payment reflected the balance of power prevailing at the time between oil owners, producers and consumers.

The Iraqi oil concession, however, arrived too late to catch up with the first stage and was in quite a hurry to make the fourth. Iraq preferred to go directly from the third stage into full nationalization.

2.2.1 TERMS OF THE OIL CONCESSIONS

The first oil concession in Iraq was signed in 1925. In this agreement the TPC had got the right to choose 24 blocks, each with a size of eight sq.miles, within 32 months. The rest of the Iraqi territory was to be offered through a sealed tender rather than through open bidding with the right of the TPC to bid. The duration of the concession was 75 years, at a time when the standard period in the US was only 20 years.

As suggested earlier, the TPC never took this agreement seriously. Its aim was to get an official document for its claim on Iraq's oil and to postpone the dictation of the real terms to a later stage. This stage came in the 1931 agreement which replaced that of 1925. The new agreement simply eliminated any competitive feature found in the earlier one. The IPC got an exclusive concessionary right over an area of 35,000 sq.miles (compared with 190 sq.miles in the 1925 agreement). The government was then more interested in the immediate relinquishment of some of the land and in the promise that an oil pipeline would be constructed before 1935. In reality, the 1931 agreement put an end to the block system in Iraq, and freed the company from three major previous obligations: the construction of a refinery, the con-

struction of a railway line to the Mediterranean and the right of others to use, against payment, 30% of its pipeline capacity.

Financially, the IPC was to pay £400,000 in gold per year up to the first full oil exporting year. Half of this was to be deductible from future royalties, which were fixed at 4 sh. gold per exported ton. Payments to the government during the first 20 years of export were not to be less than £ 400,000 per annum.²⁷

Once the government got back some of Iraq's territory after the 1931 agreement with the IPC, a new 75 year oil concession was immediately given to the British Oil Development Co. at the standard royalty fee. The new element in this concession was the government's right to 20% of the company's shares, 5% of which was to be given freely and the remaining 15% to be paid for by the interest on the first five. The contract stated several other obligations including time scales for pipeline construction, drilling and exporting.²⁸ As mentioned earlier, the IPC was soon in full control over this company, renamed the MPC. The MPC signed a new agreement with the government in 1939, in which it was released from a number of obligations. The company, in return, gave the government an interest-free loan of £ 3 m. to be repaid from future royalties.

The Basra Oil Concession, which was given directly to the IPC, was on the same financial basis as the previous ones. The IPC, the MPC and the BPC then became the affluent companies within the IPC group.

The first full export year of the IPC came as late as 1935. This was after the completion of the pipeline connecting the northern Iraqi oil fields to the Mediterranean ports of Tripoli in Lebanon and Haifa in Palestine. The pipeline's capacity was 4 m.t./year, but it was increased substantially both in 1949 and 1952. The BPC started exporting oil from the fields discovered in the southern region of Iraq. A 75 mile pipeline connecting the fields with a deep-water harbour on the Gulf was constructed for that purpose. The MPC began its export first in 1952 via a 135 mile pipeline connecting the fields in the northern-most regions to a pump station on the IPC Mediterranean pipeline.²⁹

Even before the outbreak of the Second World War, government-IPC relations were strained. At least four reasons can be found for this: 1) the government's demand to raise the royalty charge up to 6 sh. gold per exported ton;³⁰ 2) the gold question, which became a serious problem since the

Bank of England abandoned in 1931 the gold standard and devalued the pound. A sharp difference appeared then between the official gold price (on which the IPC calculated its payment) and its price in the local markets;³¹ 3) the problems of admitting Iraqis as shareholders in the IPC as well as replacing, when possible, foreigners by natives; 4) the chronic demand of the government to increase crude oil production and export and therefore, its oil revenues.

Negotiations between the government and the IPC started soon after the war to find some solution to the government's demands. By 1950, when it seemed as if a settlement had been reached, the Saudi-Aramco 50/50 profit-sharing agreement was signed. The IPC offered directly to negotiate new agreements with Iraq on the same lines as the Saudi Concession.

Why did Aramco offer to share "its" profit with the Saudi? The following reasons may give an answer: 1) the Saudi government demanded an increase in its share of the profit. It was estimated then that the government's oil revenues amounted to less than half of Aramco's profit;³² 2) the demonstration effects of the new Venezuelan 50% income tax on the oil companies working there in the late 1940's as well as the better payment terms offered by the Italian Getty in its oil concession in the Saudi neutral zone;³³ 3) Aramco's wish to maintain as good relations as possible with the Saudi government due to the extraordinary potential of the Saudi oil.

The oil companies' choice of the profit-sharing formula rather than other formulae for increasing the host government's share of the oil revenues was decided upon, however, by the financial regulations in their mother countries. For, while the royalties paid by the companies to the producing countries were treated as expenses deductible from income before calculating the taxable income in their mother countries, the 50% profit share paid to the producing government was considered as income tax, and thus became subject to full compensation from the income tax paid to the mother country's treasury.³⁴ The oil companies were, therefore, generous, but largely at the expense of the treasuries in their mother countries.

Early in 1952, the Iraqi government and the IPC signed the 50/50 profit-sharing agreement, which was to be in effect from the beginning of 1951. The IPC group undertook to pay the Iraqi government a yearly amount equal to 50% of its companies' profit. For the crude exported via the Mediterranean, the profit was defined as "the difference between the Iraqi border value per ton of each such oil and the actual costs or fixed costs as the case may be...

multiplied by the number of tons of oil so exported".³⁵ The agreement spelled out figures to represent the "fixed costs" which were to be considered in calculating the profit if the actual cost of production did not diverge from them by more than 10%. In order to determine the "border value", a use was made of the so-called oil "posted prices".

Once the difference between the oil posted prices in the Mediterranean and Gulf terminals was divided by the distance between these two locations, it became possible to determine the price of the oil at any point in the pipelines. The value of Kirkuk oil on the Iraqi-Syrian border was thus determined at 94 sh. per ton (compared with 130.6 sh f o b on the Mediterranean terminals) in 1951. However, the IPC was granted discounts from the posted prices in order to promote the export of Iraqi oil.

The government's 50% share of the profit was to contain 25% of the IPC and MPC and 33% of the BPC crude oil production delivered in the terminals. The government was obliged, however, to resell more than half of these quantities back to the oil companies. Various form of taxes were levied to ensure that the government's revenue accounted for one-half of the IPC profit. The agreement spelled out the minimal levels of output as well as of government receipts. Other articles arranged for the local supply of oil at a fixed price, increased the number of Iraqis on the board by a second director, founded a technical school in Kirkuk and gave the Iraqis a priority in employment opportunities.

From the government's point of view, the terms of the Iraqi profit-sharing agreement were the best of their kind in the area at that time. It is thought that the events that were then taking place in Iran's Mossadeq may have been one of the main reasons behind that.

However, the Iraqi political opposition was not satisfied. Nationalization measures along the lines of the Iranians, they argued, should have been Iraq's aim.³⁷ It was also against the government's agreement to "sell out" the whole gold question for ID 5 m. at a time when the matter was in court and was expected to bring some four times that amount.

The sharing agreements marked a new era for the oil industry in the Middle East. The posted price policy proved to be advantageous for both the oil companies and the producing countries.³⁸ They marked one of the first steps the governments took the road towards acquiring a major share of the oil extraction profit. This time it was done mainly at the expense of the

oil importing countries, but soon it would be at the expense of the producing companies as well. With the emergence of the sharing agreements a shift took place in the nature of the problems that characterized oil government - company relations. The determination of the oil price level, which was to some extent of no importance to the exporting governments in the previous type of agreement, i.e. the fixed tonnage royalty, now became and would remain thereafter, of prime concern.

2.2.2 THE OIL OUTPUT AND POSTED PRICE

The oil output growth rate of the 11 joint OPEC members during the period from 1950 to 1972 was very regular, at 9.5% per year.³⁹ This harmony in the pace of the joint output increase throughout the years was contrasted with the uneven and fluctuating growth rate of oil output in the individual countries. Iraq was among the most unfortunate in this respect. The level of oil output was a chronic problem between the government and the companies.

Due to a number of economic considerations such as the unit extraction cost, the extraction location in relation to the consuming centers and the varying qualities of oil, the oil companies did not collect a unified profit on the unit of oil produced from each concession in the Middle East. Consequently, the companies of the international oil cartel were not indifferent to increasing production from any of their concessions. Since the oil production cost from the Iraqi fields was relatively high,⁴⁰ and since the American companies who possessed the largest marketing outlets owned less than 24% of the Iraqi concession compared with 35% and 100% of the Iranian and Saudi concessions respectively, Iraq's oil output was subject to severe limitations. The Iraqi and Kuwaiti oil output were in fact determined as residuals after fixing the production levels of the other concessions. This matter would be even clearer in the mid 1960's, when the marketing of the Libyan crude oil would be conditioned by a decrease in the Iraqi production. A final reason that may explain the modest rate of growth of the Iraqi oil was the presence of interminable disputes concerning other issues and the attempts of the companies to use production limitation as a means of putting pressure on the government.

The second major source of problems between Iraq and the companies after the introduction of the profit-sharing formula was the issue of posted prices. It was apparent to the companies of the international oil cartel that their programming of the world oil supply could not be carried out efficiently in

the absence of a price-matching system. No matter from where it was imported, oil cost the same to the consumer at a particular place. I.e. if crude oil of a unified quality was considered to have the same f o b price at any sea terminal in the world, a fixed transport charge was added for every consuming location no matter from where the oil had come. The fixed transport charge was calculated on the basis of the distance between that specific consuming location and the major oil exporting terminal in the world. When Texas still was the greatest oil exporter, the fixed transport charge for any consumer in the world was calculated on the basis of its distance from the Gulf of Mexico, regardless if the oil had come from there or not. But as the Middle East was emerging as a great oil exporter, the general result of the Texas pricing system implied the following: if any Middle Eastern producer delivered oil to a location more distant from the Middle East than from the Gulf of Mexico, then the system worked to the advantage of the consumer, and vice versa. In the latter case the supplier collected a freight charge for a distance that did not exist in reality. This was known as the "phantom freight".⁴¹

By 1944 the British Navy refused to pay the phantom freight when buying Middle Eastern oil in the Indian harbours. This coincided with the astonishing achievements of the Middle Eastern oil. In 1945 the oil-pricing system was modified and the Arabian Gulf was added as a second price-basing point. The "price shed" point, i.e. where the highest c i f prices of oil in the world were found, moved from Burma to two other locations, Malta and Hawaii. The Middle Eastern oil won many markets by this step, e.g. the East of Suez region and the northern Mediterranean countries, up to Italy.

During the rest of the 1940's, the oil barrel price on the Arabian Gulf was either decreasing or increasing at a slower pace than the one on the Mexican Gulf. By March 1948 the price shed had shifted further to the West, to London. By the end of that year the Arabian Gulf oil was able to compete with Venezuelan oil in the European markets.⁴² A year later it was able to compete with it even as far as the Atlantic shores of the USA. The matching point of the c i f prices was approaching New York.⁴³ This trend continued in the 1950's as well, though at a slower pace. And after a further two "famous" price reductions in 1959 and 1960, the Middle Eastern oil was competing against the Western Hemisphere oil in every important consuming center.⁴⁴

Most producers held the view that the oil companies, being vertically integrated to a large extent, were not much affected by these price reductions

because they were able to transfer their profit from the extraction stage to the transport, refining and distribution stages. The fact that the prices of the refined products in the Arabian Gulf were almost identical with those in the Mexican Gulf strengthens that point of view.⁴⁵ Another source of complaint from the producing countries was the presence of a wide range of discounts from the declining posted prices. Up to 1955, a 12-15% discount rate on the posted prices was applied in Iraq. The rate was reduced thereafter for the minimal quantity exported but remained as high for any extra exports.

The companies were in fact in a dilemma: on the one hand, governments were pressing for increased production while, on the other hand, markets were buyers' markets throughout the 1950's and 1960's. The cut down in the posted prices was one way of getting around the problem, whereby the exporting countries could be satisfied by the increase in their overall revenues but carry a share of the decline of the return per unit exported as well. It is generally agreed that the producing companies throughout the 1950's were collecting less than one-half of the profit of the oil companies. The formation of OPEC in the early 1960's is thought to have altered that trend.⁴⁶

2.2.3 OTHER DISPUTED QUESTIONS

The July revolution of 1958 had in fact opened the way for the complete national possession of the national wealth, oil. The Iraqi revolution came as a surprise and implied the fall of "what was considered the most stable and progressive government in the Arab world and virtually the only one the West had felt it could rely on".

Not long after, the new Iraqi government called on the companies for a new round of negotiations. Besides the output rate and posted price questions, the government raised four other issues: the relinquishment of the land that was not subject to actual exploitation by the companies, the government's right to participate in the equity capital of the IPC, the revision of some of the calculation methods used in the companies' accounting books and, finally, the finding of a solution to the problem of the released natural gas which was still being nearly completely wasted.

Up to 1960, the IPC was actually utilizing no more than 0.5% of the concession's land covering all Iraq. Nevertheless, the company was reluctant to release any of the land to the government. The government, on the other hand,

had strong reasons for suspecting that several oil reservoirs had been discovered but had been shut down by the company in order not to be forced to increase oil output rates.⁴⁷

The source of the second issue seems obvious as well. The San Remo agreement of 1925 secured the right of the natives to possess as much as 20% of the shares of the foreign oil companies operating on their soil. The IPC claimed in the beginning that the Iraqi abstained from participation because of the uncertainty of the whole oil business at that time. In 1925 the company avoided the issue by relying on British law which prevented public participation in the capital of private companies.⁴⁸ Later, however, the company claimed that a 20% Iraqi participation could be applied only if a new share was asked for or in a newly founded company for exploring and drilling in new locations.

The third issue referred to accounting problems. Here, the complications and conflict of interest emerge in fact from the complex business nature of the IPC, as well as from the ambiguity of the terms of the sharing agreement. The financial questions subject to government - IPC negotiation can be summarized in the following points:

1) The IPC profits were frequently calculated on the basis of the "fixed cost" as determined in the 1952 agreement, and the government was paid in advance. The agreement stated, however, that if the actual cost exceeded the fixed one by 10% or more, the former cost was to be used. The companies often claimed that this was the case, and the government just as often accused the companies of overestimating their cost and applying unacceptable calculation methods. The government refused, for example, to accept items in the production cost bill such as the amortization of the rent (known as the "dead rent" which the companies had paid prior to oil production), the public relations expenses and the expenses of the London head office. The companies were also classifying exploration and drilling expenses under operating rather than under capital expenditure, a procedure which the company later changed in 1961.

2) The second type of financial issue negotiated referred to what was known as "the royalty expensing" question. The new form of royalty in the profit-sharing agreement represented 12.5% of the net output of the companies. The IPC, like the other oil companies, used to consider this royalty as being a direct credit against the total tax liabilities, i.e. it was not treated as production expenses but rather was subtracted directly from the govern-

ment's 50% profit share.⁴⁹ This procedure was changed in the mid 1960's in most of the oil producing countries and is considered as one of the earliest victories of OPEC. But the IPC did not change the procedure then, because it made its acceptance of such change conditional to Iraq's acceptance of other disputed issues.

The fourth issue referred to the natural gas which is a joint product of crude oil production. Although neighboring countries such as Iran were entitled to use freely all the natural gas they required, the IPC failed to offer Iraq more than a limited quantity and suggested the establishment of a joint venture to utilize the rest of the natural gas. The parties reached no agreement on this point. Meanwhile, up to 1959, less than 10% of the flowing gas was utilized.⁵⁰

2.2.4 THE DECREE NO.80,1961

Up to April 1961, the IPC had failed to present terms that would satisfy the government concerning the disputed questions, although some of its later offers were considered generous by some observers.⁵¹ For the Iraqis, "all things were linked as in a chain" and no partial suggestions were acceptable.

Much has been said about those negotiations. Each party claimed that the other had been raising all possible obstacles against reaching a compromise solution. In fact, the Iraqi leaders felt that they were fighting for a national cause, and because of internal and Arab considerations, they were in need of a clear cut victory. The IPC, in turn, could not afford a great loss for the sake of its interests in Iraq and its owners' interests in the region. The negotiations were suspended and the government ordered the suspension of all exploration activities. On December 12, 1961 the famous decree no. 80 was announced. This law deprived the IPC group immediately of all territories that were not under actual exploration, some 99.5% of the concessionary area. The three sub-companies were left with only 74 sq. miles. The third article of the law gave the government the right, if it so wished, to double the size of land already left to the companies. The fourth article ensured the company's right to transport oil across the relinquished land, and the fifth article ordered the company to hand over all geological surveys they had for the relinquished land within three months and free of charge.

From that date Iraq's petroleum history was to center around this decree.

The visible IPC response was to "use at much less than full capacity their exploration, production and export facilities". The "hidden" response was, however, carried out with the full cooperation of the IPC mother governments, notably the American. The State Department officials were active in a widespread campaign to discourage any other oil company from taking concessions on any part of the Iraqi land expropriated from the IPC.⁵²

Iraq's internal political chaos was soon to overshadow the picture. After two bloody coups in 1963, the new government in 1964 called for a new round of negotiations with the IPC. An agreement was reached between them in the middle of the following year. The 1965 agreement advanced the idea of founding an ad-hoc company (33% governmental and 67% IPC) to be allotted 7% of the relinquished land.⁵³ For a number of reasons, the 1965 agreement was never ratified by the Iraqi government. The 1967 Middle Eastern war buried it forever. Two months after the June war, the government issued a new decree which brought the oil question back to where it had started: the decree no.80 of 1961 was reaffirmed, no known oil bearing land was ever to be given back to the IPC, the use of the concession method for exploiting any further oil in Iraq was prohibited. The Iraqi National Oil Company (INOC) was to have exclusive rights over the relinquished land.

2.3 NATIONALIZATION

"Nationalization", according to Langley (1961) was "the ultimate threat of the producing countries, yet this action cannot be carried out without economic disaster for any Middle Eastern country".⁵⁴ This was due, apparently, to the great dependency of the oil exporting countries on the current flow of oil revenues on the one hand, and to their inability to carry out the oil production and marketing operations independently of the international oil companies on the other. Yet by the early 1970's, the oil producing countries had been able to force through most of their demands without even having had to threaten. The nationalization of the oil industry was actually undertaken by some Middle Eastern producers. This was done in spite of the fact that neither was their dependency on oil revenues reduced, nor had any spectacular change in their technical capability occurred. Whether or not a dramatic shortage in the world oil supply relative to demand developed during these ten years is a disputed question among economists. In fact, the so-called oil price explosions which took place in the early 1970's were thought to have been a very remote possibility indeed. And even as late as 1969, M. Adelman, a leading authority in oil economics, was quoted as saying: "Thus

the prospect is: continued decline of (oil) prices, but at a very slow and gradual rate".⁵⁵

A certain process of structural change in the international oil market was definitely taking place during that critical decade. But the factor that allowed the oil producing countries to reap the fruit of that change at the right moment first appeared in the early 1960's: OPEC.

2.3.1 THE FORMATION OF OPEC

Since the late 1940's and up to the mid 1960's, the Middle Eastern oil posted prices were undergoing a downward trend. This was in spite of some short-lived periods of price stability and even some increases. There were several reasons for this decline. On the demand side there was the sudden slow down of world demand for oil since 1957. The demand for energy increased in that year by only 1.6%, as compared with an average rate of 4-5% during the previous years.⁵⁶ On the other hand, in early 1959 mandatory oil import quotas were introduced in the USA.⁵⁷ At the same time a number of European countries, e.g. France, introduced a number of oil import restrictions in order to encourage oil production from their own colonies. Finally, some Latin American and Middle Eastern countries were moving toward self-sufficiency in oil, a goal which became more and more important in their efforts to reduce their balance of payment deficits.

The factors that were operating on the oil supply side seem even more important. First, there was the continuous enormous growth in the size of the proved oil reserves discovered in the Middle East and the continuous pressure of the oil governments to increase oil production and export. Second, there was the success that the American independent oil companies had had in securing very rich oil concessions and the success of some European independent companies in competing efficiently with the majors in the oil marketing field.⁵⁸ By 1964, the oil output of the three new producers, Libya, Algeria and Nigeria was some 1.5 m. bbl/day, most of which was owned by independent companies, i.e. not included in the overall arrangement of the international oil cartel.

These factors, operating both on the demand and the supply sides, resulted in severe pressure on the oil posted prices. By 1956, the oil companies were granting a discount of 10-60 ¢ of the posted prices, and some references quoted a discount rate of as high as 30%.⁵⁹

The oil companies were not much affected by these discounts in the posted prices since they were originally granted a 15-20% discount rate from the producing governments. However, as the companies realized that further discounts were needed in order to maintain a satisfactory marketing, they preferred to cut down the posted prices.

In February 1959, a cut of 18 ¢ per barrel of the Middle Eastern oil posted prices was announced. The First Arab Petroleum Congress, which took place in April of that same year, issued a statement asking that "the oil companies should consult governments of the oil exporting countries before altering posted prices". In August 1960, the oil companies announced another posted price cut of 10-12 ¢ per barrel. The Iraqi government took the initiative and called a number of oil exporting countries to a joint conference.

In September 1960, after a number of compromises, five oil exporting countries met in Baghdad. These were Iran, Kuwait, Saudi Arabia, Venezuela and the host country, Iraq. Their aim was not a modest one: to define and stabilize the price structure for crude oil. However, The Organization of Petroleum Exporting Countries emerged from that conference.

OPEC decided at that time that the oil exporting countries should, as individuals, ask the companies to rescind the price cut of August 1960. And although the governments did not refuse the payments made by the companies on the basis of the reduced prices, OPEC's point was carried through: the 1960 oil posted price reduction was the last to be ventured by the companies.⁶⁰

The concrete demands of OPEC were not introduced, however, until the Fourth Conference. OPEC then forwarded two basic issues: 1) fixing the royalty payment at a "uniform rate which members consider equitable" and 2) not allowing the royalty to be treated as a credit against income tax liability. A uniform rate of 20% was then suggested. In addition to these demands, there was the question of the 1960 price reduction which was still subject to dispute between the governments and the companies. After about two and one half years, the Sixth Conference of OPEC accepted the revised offer of the oil companies concerning the above questions. In that offer, the companies accepted the second demand of the producing countries, i.e. what is known as expensing the royalty - considering the royalty as a cost component rather than as a direct post in the governments' 50% profit share. The governments accepted, in return, to withdraw the rest of their demands as well as to grant the companies a 6.5 - 8.5% discount on the posted price.

It has been argued by some that the deal increased government earnings, roughly by as much as the 1960 price cut decreased them. Others argued, however, that the accepted offer gave the governments only one-fifth of what they had originally asked for.⁶¹

Modest as it was, this was the start. The struggle of the producer governments continued via OPEC and followed three related lines: 1) improving the terms of profit dividend, one means of which was the governments' demand for eliminating discounts, 2) changing the profit-sharing formula into property share and 3) raising the oil posted prices.

The success of the oil exporting countries on these three fronts bears out the accuracy of the observations made by Penrose as early as 1960: the oil price adjustments, and therefore the size of net revenue as well as the division of it are "within the limits set by the bargaining strength of the respective parties".⁶² During the first ten years of its existence, OPEC was gaining objective economic power, but what was even more important, it was learning how to realize it as well. When the oil price revolution came in the early 1970's, no wonder it was those who believed that oil prices are determined only by the familiar market mechanism who were the most shocked.⁶³

2.3.2 THE END OF THE IPC

Iraq would not accept the offer of the oil companies, made via OPEC, to expense the royalty. The IPC then conditioned its offer by settling the open conflict concerning decree no. 80. The government on its part failed to invite any independent oil company to operate on the territories which had been expropriated from the IPC in accordance with that decree. However, negotiations were conducted both with the Italian ENI and the French ERAB to develop independently or jointly with the INOC oil production in the relinquished territories. The failure of these negotiations was partly due to the pressure exercised by the US government on the Italian and French governments.⁶⁴

The nationalization of the Iranian oil, led by Prime Minister Mossadeq in the early 1950's, taught a valuable lesson. Mossadeq's tragedy was due to Iran's weakness on three fronts: the internal political and economic fronts and the international front. Having a solid internal political front that could not be penetrated, a minimum capability to operate the oil industry and to withstand a long boycott period, and finally a certain degree of support from other oil exporters as well as consumers seemed to be prerequisites, were

any attempt to threaten the interests of the oil companies to be taken seriously and to be successful.

Iraq, when moving toward the nationalization of the oil companies as an ultimate solution, was simply working on improving its situation with respect to the above mentioned fronts. The relations between the two main political parties, on whose bloody confrontation the modern history of Iraq was built, were eased as a first step to found the National Front in July 1973. Principles regarding a solution to the question of the Kurdish minority, including its right of self-rule, were introduced. On the second front, the INOC was strengthened by necessary legislation, financial support, technical experts and experienced workers so that it could enter into the oil production and transportation fields. On the third front, a series of agreements were signed with the Socialist countries to provide INOC with drilling equipment, pipelines, oil refineries and financial loans. The agreements also included the provision of experts and scholarships and the training of local workers in oil operations. Iraq was granted loans at a modest interest rate which were to be repaid by the crude oil once it became available to the INOC. Some contracts were also made with Italian and Spanish firms against crude oil payment. At the same time, contracts for long-term sales arrangements consisting of huge quantities of crude oil were made with the USSR and France. In April 1972, INOC produced and shipped the first quantity of oil completely independent of the international oil companies. This was from the Northern Rumalia oil field which was developed with the technical help of the Soviet Union.

A new round of negotiations between the IPC group and the Iraqi government started early in 1972. Most of the problems discussed earlier were taken up again on the agenda. A new element was that the company, since it had never recognized decree no. 80, demanded a share, a royalty, on the oil produced by INOC from the relinquished land. For the Iraqis, however, decree no. 80 was not open to discussion, especially after they, in 1970, had prohibited the granting of any further land to the IPC, whether known to be oil bearing or not. The meeting, the Iraqi thought, should deal with problems far beyond that point. There was therefore, hardly any chance of a reconciliation, although the companies showed some degree of good will by increasing the production rate during the first two months of that year. In the final meeting in May 1972, the companies presented their last offer: to put forward a production schedule,⁶⁵ to agree to expense the royalty starting from 1971, to accept the government's participation in 20% of the companies'

equity capital and to offer to pay some £ 100 m. for settling all the unsolved financial problems. The companies asked in return that INOC sell them 550 m. tons of crude oil, instead of 1100 m. tons as previously demanded, within 20 years and at a fixed price of \$ 1.65 per barrel. Furthermore, the companies demanded a royalty of 7% instead of the 12.5% previously demanded, on INOC's crude oil production from the relinquished land.

Not surprisingly, the Iraqi government rejected this offer as well. It asked the companies to be more serious, and gave them two weeks to do so. They did not, and the IPC was nationalized. The date was June 1st, 1972.

The IPC tried in vain to repeat history. Cases were brought before a number of courts around the world charging the buyers of Iraqi oil with having bought oil "stolen" from the IPC. Apart from some minor events, marketing was satisfactory, as was the crude oil production. The uncertainty element injected by the nationalization decree was soon neutralized as the world oil market turned into a severe seller's market.⁶⁶

Nine months after nationalization, the disputes with the IPC and the MPC were settled and an overall agreement was reached. The IPC was to pay Iraq £ 141 m., and the INOC was to deliver to the IPC 15 m. tons of crude oil. The MPC agreed to hand over all its assets and installations as of March 31, 1973. A new agreement was also made with the BPC which, for some reason, had not yet been nationalized.⁶⁷

In early 1973, agreements were signed between Iraq and Syria and Iraq and Lebanon to arrange for payment for oil transport, especially as Syria had nationalized the IPC pipeline and pumping stations on its territory. Forty-five years after it had dug its first oil well in Iraq, the IPC no longer existed in the Middle East.

The American and Dutch shares in the BPC were nationalized soon after the outbreak of still another Middle Eastern war in October 1973. Gulbenkian's shares followed and, finally, in December 1975 the British and French shares were nationalized as well. The book value of the BPC properties was paid in compensation.

CONCLUDING REMARKS

The struggle over Iraq may not be understood merely as a struggle to control that particular country or its valuable resource. Vital and strategic as it

was - and is, Iraq's oil was more a symbol than an asset. It was there that the new axis of the world's balance of power was established. The settlement of the Iraqi oil concession was to outline the fate of the Middle Eastern oil as a whole.

In such a context it seems absurd to speak of a free contracting will between the two parties when the oil concessions were given. Actually, many of the rulers who signed the early oil concessions were not aware of the meaning of the word petroleum.

The foundation of modern Iraq seems to have been conditioned by legalizing the IPC claims. For the Iraqis, petroleum was the summary of their relations with the West, a symbol of foreign domination, but also of the hope for a better future. Their drive for independence, freedom and development was always referred to in terms of the injustice they saw in their relations with the oil companies.

For a long time the oil companies' payments to the oil exporting government was based on a fixed royalty per each ton exported. The tonnage royalty system was changed soon after the Second World War into a profit-sharing system. This resulted in a great increase in government oil revenues, only marginally at the expense of the net profit made by the companies. The new system, however, made the posted price, along with the output rate, a major issue for the exporting governments. The struggle over the determination of this price in the following years proved to be the basic means for deciding upon the size of the shares of oil owners, producers and consumers in the oil surplus.

The conflict between the post-1958 Iraqi governments and the IPC seems to have arisen from the way in which the respective parties viewed the concession agreement. The IPC saw it as being a binding agreement that gave it a full right over Iraq's oil. The government, on the other hand, knowing the circumstances under which the oil concessions were granted in the first place, could not see why it should not handle Iraq's oil affairs in the best interests of the country, regardless of contracts.

The formation of OPEC was a necessary step without which the producing countries could not have realized the fruit of the objective economic power that they possessed. Cartelization in the oil industry was not something new, however. The new element was in fact that the producing countries had for the first time formed their own organization. OPEC was able, all of a sudden to realize all that the smoothly changing conditions warranted.

It was not a mere accident that Iraq's nationalization of the IPC came only a few months before the oil price revolution. Both, in fact, were a result of the maturing of specific factors, and somehow, each helped in the success of the other. When the IPC in the early 1970's was ready to give in to the Iraqi demands from the 1960's, the Iraqis no longer needed the IPC. The full nationalization of the industry was what they had been aiming at then, and what they finally achieved.

The oil battle had been won. But it may still prove to have been the easier struggle. As early as 1960 it was noted that "Iraq showed every sign of following the example of Venezuela down the primrose path by sowing the petroleum to the wind".⁶⁸ Lots of water has run through the Tigris and the Euphrates since then. The size of the oil industry, its resulting revenues and institutional setting have changed dramatically. But the problems that the oil revenues were to resolve may not have changed accordingly: "poverty and malnutrition, illiteracy and inefficiency, very uneven distribution of income and lack of basic capabilities: human and physical."⁶⁹

This is the real battle to be won now, and it is here where it will be seen whether the petroleum revenues are "sown to the wind" or rationally allocated for an abundant future harvest.

NOTES

1. Tugendhat & Hamilton (1975), p 61.
2. Preliminary payment for the Persian oil concession was £ 20,000. The Persian government was to collect 16% of the future profit. As D'Arcy ran out of money in 1905, Britain's Chairman of the Admiralty played a role in engaging him in the Burma Oil Co., another British venture. A year after the discovery of oil in Persia, in May 1908, the Anglo-Persian Oil Co. was founded to exploit the concession. The name of the company was later changed to the Anglo-Iranian Oil Co., and finally to British Petroleum (BP).
3. Hoffman (1927), p 198.
4. Lutsky (1971), p 388.
5. The Royal Dutch Company, founded in 1890 and operating mainly in the East Indies, and the London-based Shell Transport & Trading, established a new joint company in 1907, The Royal Dutch Shell, with 3/5 Dutch and 2/5 British ownership.

6. C.S. Gulbenkian (1869-1955) referred to as the "Talleyrand of oil diplomacy", Earle (1924), p 276, and considered "though nobody could quite say how, a major figure in international oil industry". He used his "grasp of the industry politics, his knowledge of each company's strength and weakness" to protect his share in Iraq's oil. Gulbenkian's "ultimate determination was the threat to expose their deals and treaties in the court, and it worked very well". Tugendhat & Hamilton (1975), p. 83. For more information about Gulbenkian life and business, see Hewins (1967).
7. Longrigg (1954), p 30 and Tugendhat & Hamilton (1975), p 68.
8. Earle (1924), p 269.
9. Hurewitz (1965a), p 278.
10. Ibid., p 286.
11. Antonius (1965), p 429.
12. Hurewitz (1965b), pp 75-77.
13. In 1923, Compagnie Francaise des Pétroles (CFP) was founded to handle the French share in the TPC. The company was reorganized in 1931 and the French government acquired 35% of its shares with 40% voting power.
14. Blair (1967), p 34.
15. Mikdashi (1966), pp 66-67.
16. Earle (1924), p 274.
17. Ibid.
18. These were: Standard Oil of New Jersey (later known as Esso and Exxon), Gulf, Texas, Sinclair, Atlantic and Mexican. Five of them founded in 1923 an ad-hoc company: The Near East Development Corporation. By 1934, Exxon and Mobil were the sole owners of this company with equal shares. Tugendhat & Hamilton (1975), p 76.
19. Several references cited that the British government conditioned the ratification of the Iraqi Constitution and its support to Iraq in getting the Mosul province by requiring that the Iraqi government ratify the TPC oil concession. See O'Connor (1955), p 308, Stocking (1970), p 31 and the letter from the British High Commissioner in Iraq to the Iraqi Prime Minister in August 8th, 1923. In Al Abbas (1975a), p 177. The League of Nations decided, in December 1925, that the Mosul province was to belong to the Kingdom of Iraq provided that the British mandate was prolonged to 25 years. Turkey was awarded 10% of Iraq's oil revenues for 25 years as compensation.
20. Mikdashi (1966), p 72. The shares of the British Oil Development Co. were distributed in 1932 according to the following: 46% British, 12% German, 12% French-Swiss and 3% Italian. Al Abbas (1975a), p 10.
21. Mikdashi (1966), p 72.

22. Except for a small area in the northeast, known as the "transformed" area. This area of 800 sq. miles belonged first to Persia and was included in the oil concession of D'Arcy from 1901. It was transferred to Turkey in 1913 and then to Iraq in 1925. APOC discovered an oil field in the territory in 1919, and signed a new agreement with the Iraqi government in 1925. APOC founded the Khanken Oil Co. to exploit this concession and constructed there a small oil refinery.
23. All information concerning the Oil Cartel agreements is taken from The International Petroleum Cartel (1952), pp 200-300. The immediate aim of the As Is agreement was to put an end to the price war that broke out between Mobil and Shell. Shell was taking revenge on Mobil because the latter had violated the oil boycott measures against USSR.
24. Gold was a reason, but not the only one. The Saudi King probably preferred the Americans to the British because he thought that the establishment of American interests in his country would provide some protection against Britain who historically had been supporting his enemies in the region.
25. Tugendhat & Hamilton (1975), p 95.
26. Mikdashi (1966), p 70.
27. Al Abbas (1975b), pp 18-22.
28. Al Abbas (1975b), pp 23-37.
29. Longrigg (1954), p 72, 76 and 184.
30. The root of this demand can be found in the 1925 agreement where royalty on each exported ton was to be between a minimum of 2 sh. gold and a maximum of 6 sh., depending on the profitability of the company. The IPC claimed that it accepted a minimum production rate in the 1931 agreement in return for fixing the royalty charge at 4 sh. per ton.
31. In 1949 the IPC was paying ID. 0.23 as equivalent to the 4 sh. of gold. The local market price was then giving as much as ID 0.425 for the same amount of gold. Cf Mikdashi (1966), pp 151-152.
32. Blair (1976), p 197.
33. Getty offered a fixed royalty of \$ 4 per exported ton, plus a 20% share of the profit made. Al Akkad (1973), p 43.
34. ARAMCO's payments to the US treasury fell between 1950 and 1951 from \$ 50 m. to \$ 6 m., while its payments to the Saudi government rose from \$ 66 m. to \$ 110 m. It was also estimated that the total payment of BP to the Middle Eastern countries amounted to £ 133.2 m. in 1962. The British treasury granted the BP in that year a direct income tax credit of £ 88.3 m. See Blair (1976), pp 189-201 and Mikdashi (1966), pp 130-140.
35. Al Abbas (1975b), p 164.
36. During the early days of the industry, every oil owner used to post a specific price for his oil on the rig. The idea was kept by the major oil companies and the f o b posted prices of crude oil as well as of

products were reported by them and published daily. Ghanem (1975) p 26. The Middle Eastern posted prices, however, hardly reflected at any time the real oil prices seen in the markets. Shell's 1969 annual report spoke of two aims for these prices "to provide a rational framework which would represent a fair price as between sellers and buyers" and a price that "would be acceptable to the government as a basis for calculating taxable profit". The Middle Eastern posted price was serving the second aim only, since the early 1960's. It may be for this reason that Leeman (1962) ends up "doubting that posted prices of the Middle East are very meaningful". P 4.

37. Penrose & Penrose (1978), p 157.
38. Penrose (1960), p 209.
39. Blair (1976), p 101. During the period from 1950 to 1972, the coefficient of determination of the joint oil output regression was as high as 99.9%.
40. The oil production cost was high on a regional standard only. For while the fixed cost of production was put in the agreement at 24 ¢ per barrel, the average production cost was put at 80 ¢ per barrel in Venezuela and as high as \$ 1.75 per barrel in the USA. The average production rate of the Iraqi oil well amounted to 11,200 bbl/day in the early 1950's, which was one of the highest in the world. Issawi & Yeganeh (1962), pp 84-99 and UN (1962).
41. Frank (1966), pp 13-15.
42. Leeman (1962), pp 143-144 and Issawi & Yeganeh (1962), p 55.
43. Mikdashi (1966), p 97. The difference in the barrel prices of the two Gulfs rose from 12 ¢ in 1941 to 82 ¢ in 1949.
44. Frank (1966), p 101.
45. See Penrose (1968), p 185 and 190. Issawi & Yeganeh (1962), p 118. It is important to note that The First National City Bank had published in 1958 and 1968 two disputed studies that arrived at an opposite conclusion: "All profits in the international petroleum oil industry were made in the production of crude and that transportation, refining and marketing were carried out at sharp loss". Cf Stocking (1970), pp 423 - 430, Mikdashi (1960) and Leeman (1962), chpt. III.
46. The Iraqi oil posted price on the Gulf was reduced by 5 ¢ in the early part of 1956. For a review of the interest conflict among owners of the IPC in determining the Iraqi oil posted prices, see Hartshorn (1962), p 21.
47. See for example a CIA report cited in Blair (1976), p 83.
48. Mikdashi (1966), p 203.
49. In 1970 the Iraqi government published a numerical example to clarify her point of view: if posted price was 172 ¢ per barrel, the government's share of profit would amount to 75 ¢ without royalty expensing as compared with 86 ¢ if royalty was expensed. Ministry of Oil and Minerals (1970), p 20. In the early 1970's, the government charged the IPC for ID 99 m. as a return of the royalty expensing between 1964 and 1970. Mussawi (1973), p 108.

50. Al Ghazi (1976), p 37.
51. Since some of the relinquished land was strongly suspected of containing oil reserves, the company offered to relinquish as much as 75% of the land immediately and another 15% during seven years. The government was prepared to accept the relinquishment of even 50% of the land only on the condition that it have the right to choose the plots. C f Sayegh (1968), p 161 and IPC (1962), p 5.
52. For the full details of the State Department's involvement in this question, see Blair (1976), p 86 et.seq.
53. Longrigg (1968), p 365. The allotted land was conditioned to include the Northern Rumaila oil field which was discovered independently of the IPC.
54. Langley (1961), p 266.
55. Cited in Blair (1976), p VII.
56. Frank (1966), pp 92-93. The demand for oil outside the USA grew in 1957 only by 6% compared with 11% before that. The US oil imports fell in that year by some 7%. See also Oil & Gas Journal, (1969), p 151.
57. The American oil import quota "probably had some tendency to depress oil prices outside the US". Leeman (1962), p 202. It was recognized that the "independent" American oil companies were to be the ones most affected by the quota system. Some authors were puzzled by the American policy which, on the one hand, encouraged American investment in the oil industry abroad and, on the other hand, depressed the international oil prices.
58. There were some 28 American oil companies engaged in oil activities outside the US before 1945. By 1958 the number rose to 190. Frank (1966), p 96-99. The most outstanding example of an European independent oil company was the Italian ENI, headed by the remarkable E. Mattei.
59. Mikdashi (1966), p 172.
60. Since then, actual arm's length prices alone were declining. In early 1965, a price of \$ 1.60 per barrel was reported for the Arabian light crude. It went down to \$ 1.29 by 1968. Having the posted prices fixed at their 1961 level, the governments' 50% share of the profit became similar to the fixed return on the exported tonnage.
61. It was estimated that the government's earnings would increase by 15-23 ¢ per barrel if all these demands were realized. Mikdashi (1966), p 250. See also Frank (1966), p 113.
62. Penrose (1960), p 211.
63. The posted price of the light Arabian crude (34⁰ API) rose from \$ 1.88 to \$ 2.59 per barrel in 1972 to \$ 3.10 one year later, to \$ 5.11 in October 1973 and to \$ 11.65 in 1974.
64. Blair (1976), p 89.

65. When the IPC proposed a production level of 30 m.tons per year, the government put forward three suggestions: that the IPC should produce 57 m. t/y and that the government would itself market the difference, that the IPC should produce 30 m. t/y only and the government should have the right to utilize the rest of the pipeline capacity, and finally, if the northern fields were not profitable as the company claimed, then the government was ready to take over and compensate the company from the southern fields.
66. Iraq's crude production in 1972 suffered from a setback of some 16% compared with the level from the previous year. But in 1973 the production level rose by 37% over the 1972 level. The export rate declined by 14% and then rose by 28% respectively. BP (1976), p 18 and UN Studies, (1975), p 83.
67. In the political manifesto of the 8th Conference of the Socialist Arab Ba'ath Party (1974), p 49, the following two reasons were given for excluding the BPC from the nationalization: to provide the government with the hard currency during that critical period and to strengthen the government's bargaining position and make the IPC group accept decree no. 80 as well as nationalization. However, this manifesto demanded that the government continue the process in order that Iraq would possess full control over all its national wealth.
68. O'Connor (1962), p 318.
69. Hashim (1975), p 102.

3 IRAQ'S ECONOMY: THE SETTING

INTRODUCTION

The Iraqi economy has been going through a process of evolution during the last few decades, however slow, sporadic or confused that process might be. Three dates are of special importance in this context: 1) the July revolution in 1958, by which the political power of the old élite was taken away and the groundwork for the restriction of its economic power laid down; 2) the nationalization decrees of 1964, which laid the foundation for the country's ever-growing public sector; and 3) the nationalization of the IPC in 1972.

However, the process of transformation cannot be confined to a few specific dates in history or to particular government decrees. These can only facilitate or encumber the progression of events. The socio-political and economic evolution of any country follows a pattern of continuity and change that is both interrelated and high complicated.

The purpose of the present chapter is to delineate the economy of Iraq. In as far as the agricultural and industrial sectors are concerned, especially two aspects shall be our concern: the institutional evolution of the means of production, and the landmarks of the expansion of the productive capacity and its major bottlenecks. In as far as the crude oil sector is concerned, special attention shall be given to the role played by the oil revenues in the economy. Furthermore, the chapter will shed some light on the income distribution and touch upon the various aspects of the political management of the country.

The aim of the present chapter is, in short, to give a general overview of Iraq's economy in a historical context. Hopefully, this will furnish the groundwork for an evaluation of the country's planning experience, a topic to which we shall return in chapter 4. The various economic and political aspects that will be dealt with here will be referred to frequently throughout the study, especially when considering the determinants of development.

3.1 THE GENERAL FEATURE

The land area of Iraq encompasses some 435,000 sq.km. The country is divided roughly into three parts: the deserts along the western and southern borders which cover about 38% of the country; a mountainous area to the north and northeast which is the major rain-fed region and covers some 22% of the land area; and finally, the hills and flatlands which lie to the south and between the two great rivers the Tigris and the Euphrates. It has been estimated that in the mid 1970's, a little less than one-half of the country's areal was cultivable and that only half of this area actually was under cultivation. Yet less than half of the cultivated land was in crops, since the remainder was left as fallow land.¹

The rainfall in Iraq, averaging less than 16 in. annually, is extremely unevenly distributed from month to month and from region to region. Agriculture is therefore largely dependent upon utilizing the water of the country's rivers. In 1972 the average annual flow of the Tigris and the Euphrates was about 1215 and 964 cubic m per second respectively. The sum of the flow from the other four major rivers in the country was about 700 cubic m per second.² Early in this century a water construction works program was initiated, having the double purpose of regulating the rivers' flow and preventing floods. The major efforts in this field were made, however, in the 1950's and thereafter, when increased oil revenues and the assistance of foreign experts and organisations became available. These activities resulted in an increase in the irrigated zones by more than 40% during the period from 1950 to 1970.

The first population census was conducted in 1947. Then the Iraqis were estimated to be about 5.2 millions. By 1975, based on the 1956 census, the population of Iraq had risen to 11.1 million. The present rate of increase is about 3.2% annually, one of the highest in the world. However, the man/land ratio (cultivable or cultivated) in Iraq is one of the best in the Middle East. More than 54% of the population is in the 0 to 19 years of age group.³

In 1975 the illiteracy rate was 65% (51% among men and 79% among women). This can be compared with an 32% illiteracy in the middle 1950's. A major campaign was launched in 1978 to eradicate illiteracy within three years.⁴ The ratio of economically active persons to the total population averaged 23.5% in 1970 (52% for men and as little as 5% for women). In 1973

the sectoral distribution of the labor force was as follows: 52% in agriculture, 21% in services, 6% in manufacturing, 6% in transport and 0.6% in mining and quarrying. It was also estimated that only about 7% of the labor force was unemployed.⁵

After crude oil, natural gas is the most important natural resource in Iraq. The gas reserves were estimated in 1978 to be about 28,000 b. cubic ft. These reserves are found either in free gas deposits or together with crude oil deposits. In the latter case, gas is produced jointly with oil. For every barrel of oil, som 200 to 700 cubic ft. of gas are freed. In 1972 only about 13% of the gas freed was utilized. It has been estimated that between 1951 and 1973, Iraq had lost 914 b. dollars as a result of the poor utilization of its gas deposits.⁶

Iraq is also rich in sulphur ore. In 1967 a plant was established in Karkuk to extract sulphur from the oil, the annual capacity of which was 120,000 tons. At present some of the Iraqi sulphur is being exported.⁷ Large deposits of phosphate have been discovered in the western desert area close to the borders of Syria and Jordan. The annual capacity of the plant presently under construction in that area is planned at 3.4 m. tons of various phosphate fertilizers during the first stage of production.⁸

Other minor mineral deposits can be found in Iraq, the most important of which are iron and glass silicate. It should be stressed however, that a comprehensive geo-physical survey may well alter this picture substantially. Little is known so far, and even less published, about Iraq's mineral resources.

3.2 THE CRUDE OIL SECTOR

The oil industry requires huge amounts of initial investment. The initial investments were larger in the Middle East than anywhere else, for several reasons. Infrastructure facilities were lacking, natural conditions were severe, and oil-transport pipelines had to be constructed for long distances. But because of the very large scale on which oil operations can be conducted and the unusually favorable geological formations, the capital invested per unit of oil reserve discovered is lower in the Middle East than anywhere else in the world. The oil industry is also characterized by its low variable cost, i.e. by its high capital/labor ratio. In comparison, in the early 1960's, variable cost accounted for 20 to 29% of the total extraction cost per barrel in the US.⁹ Since the start of its operations and upto 1962,

the gross fixed capital expenditure of the IPC group in Iraq was estimated to be about 820 m. dollars. The greatest portion of this amount was spent on the construction of the oil transport pipelines. Only a minor portion of this amount came originally from abroad. The IPC's capital formation was rather limited during the following period, amounting to only 27 m. dollars between 1962 and 1970.¹⁰

3.2.1 PRODUCTION, RESERVES AND GOVERNMENT RECEIPTS

The fluctuations in Iraq's crude oil production, which can be seen in the following Table, can largely be explained by the relationship between Iraq and the IPC. The huge production increase during the period 1951 to 1953 was a consequence of the 50/50 profit-sharing agreement. Similarly, the stagnation in production in the early 1960's was in response to the conflict concerning decree No. 80. The Middle Eastern wars of 1956 and 1967 also explain some of the periodical declines. In general, however, an upward trend can be seen, with an annual average of 11% between 1953 and 1971, and 14% between 1972 and 1977. Up to 1977, the total accumulated output from Iraq's oil reserve amounted to some 12,750 m. bbl.¹¹ Government receipts from oil are a function of production volume, the terms of agreement with the concessionaires and oil prices. A major increase in government revenues occurred on two occasions: when the profit-sharing agreement was enforced in the early 1950's and when the nationalization measures were taken, almost simultaneously with the oil price "revolutions" in the early 1970's.

Iraq's share of the proved oil reserve in the world decreased from 10% in 1950 to 5.3% in the middle of the 1970's.¹² And as can be calculated from Table 5.1, the proved oil reserve/annual output ratio declined from 80 years in 1955, to 52 years in 1965 and to 42 years in 1975. The reserve/output ratio is still satisfactory, however, especially when compared with the recommended figures of over 15 years. The reserves/cumulative production ratio was, in 1976, on the order of 3.¹³ Oil production capacity has increased substantially in Iraq during the last few years, largely because of the discovery and exploitation of new oil fields, but also because of the improvement in the capacity of the existing wells and the application of advanced extraction techniques.

The transport capacity of the pipelines could represent a rigid constraint on the amount of oil that Iraq is able to export. Major works have been carried out throughout the 1970's in order to expand the Iraqi pipeline

capacity and to give the country a greater degree of export flexibility. By the end of the 1970's, the major pipeline network was more than 7000 km long.¹⁴ Among the more important pipelines are the Kirkuk-Mediterranean pipelines (to Banias-Syria and Triboli-Lebanon), having a total capacity of about 65 m. tons/year. The Kirkuk-Dortyol (Turkey) pipeline opened in 1977 and is 1005 km. long. It provides an additional outlet for the Iraqi crude to the Mediterranean, and has a capacity of 35 m. tons/year.

Table 3.1 Value and Volume of Iraq's Crude Oil Output and Export. Government Receipts, Crude Oil Reserves and Refining Capacity.

	1 Output	2 Govern. Receipt	3 4 Crude Export		5 Refining Capacity	6 Proved Reserve
	m. bbl.	m. ID	m. bbl.	m. ID	1000 bbl.	b. bbl.
1950	47.9	5.3	46.0	23.6	3,470	8.2
1951	61.9	13.3	59.1	33.5	3,470	10.0
1952	139.4	32.4	129.1	111.3	3,470	12.0
1953	208.7	58.3	210.1	120.9	3,470	13.0
1954	226.9	68.3	220.5	156.1	17,050	14.2
1955	249.0	73.7	239.6	169.2	17,080	20.0
1956	231.7	68.8	220.7	156.9	17,080	22.0
1957	161.9	48.9	150.5	113.1	20,370	25.0
1958	263.9	79.9	251.3	185.5	20,370	25.0
1959	308.8	86.6	290.4	201.7	20,370	25.0
1960	351.5	95.1	337.7	222.6	27,850	27.0
1961	362.8	94.8	344.8	223.1	27,850	26.0
1962	364.0	95.1	345.4	223.7	27,885	26.0
1963	419.8	110.1	405.8	259.9	27,885	25.0
1964	454.6	126.1	442.3	282.0	27,885	25.0
1965	479.1	131.4	461.3	294.0	27,885	25.0
1966	508.1	140.8	483.6	307.1	28,430	24.0
1967	448.2	124.6	425.5	272.0	28,430	23.0
1968	550.2	174.0	518.9	345.0	30,260	28.0
1969	555.2	179.6	524.8	347.5	37,575	27.0
1970	564.3	186.1	541.0	367.5	37,560	32.0
1971	618.3	276.3	586.0	524.2	37,550	36.0
1972	536.5	189.9	505.3	422.5	36,000	29.0
1973	736.5	562.1	699.4	635.1	36,000	31.0
1974	719.2	1982.2	672.3	2026.9	61,500	35.0
1975	825.5	2225.5	745.9	2408.8	61,500	34.0
1976	884.0	2522.2	829.9	2691.4	61,500	34.0
1977	903.5	2848.7	766.5	2807.3	61,500	34.0

Col. 1 1950-65 PPS Jan. 1950 - Jan. 1965; 1966-76 AAS (1976), p 171; 1977 The Petroleum Economist, Jan. 1979.

Col. 2 1950-53 Al-Nasrawi (1967), p 23; 1953-55 Haseeb (1964), p 23; 1956-74 Sayigh (1978a), p 37; 1975-77 The Petroleum Economist, July 1978 to Nov. 1978.

Col. 3 1950-60 Issawi & Yeganeh (1962), p 187; 1961-63 UN Supplement, (1961-1965); 1964-65 The M.E. & N. Africa (1970/71), p 316; 1966-69 UN-Studies (1973-1975); 1970-76 AAS (1976), p 171; 1977 The Petroleum Economist, July 1978.

Col. 4 1950-56 CBI (1950-56); 1957-62 The M.E. & N. Africa (1958-65); 1963-75 IMF, Vol.20, 25, 27 and 29; 1976-77 OAPC (1978).

Col. 5 & 6 Oil & Gas Journal, 1950-1977.

Up to 1950, Iraq had only one oil refinery worth mentioning. Its total refining capacity was at that time about 10,000 bbl/day and most of the products needed to fill the gap between that amount and local consumption were imported from Iran.¹⁵ Refining capacity has improved since then, although there have also been long intervals of stagnation. See Table 3.1. Between 1974 and 1977, the refining capacity amounted to about 7% of Iraq's crude production. Several new major works projects were carried out thereafter and by 1979 there were 11 refineries and oil-processing plants in the country, with more than 300,000 bbl/day capacity. There are plans to double this capacity by 1985.¹⁶

3.2.2 AGGREGATE SUPPLY ROLE OF OIL REVENUES

In order to show the role that oil revenues have played in the Iraqi economy, we shall adopt here a system of classification regarding aggregate supply and demand roles that was applied on the Iranian economy by Vakil (1977). By the aggregate supply role is meant the share of oil revenues used in financing the variables appearing on the credit side of the national account tables.

Crude oil value added in both the GDP and the NI are presented in the following Table (3.2). Since the latter value added is calculated on the basis of a number of assumptions, it should not be taken too literally.

The crude oil value added in the GDP followed three phases during the period under study. Throughout the 1960's, the value added increased at a somewhat lower annual rate than the aggregate GDP, i.e. the share of crude oil in the GDP declined from 36.7% to 30.2% between 1960 and 1970. During a short interim period, between 1970 and 1972, the ratio returned to its 1960 level. And finally, an extraordinary increase in the ratio occurred in the mid 1970's, corresponding to the increases in the price of crude oil. In contrast to the crude oil added value in the NI, this ratio hardly reflects any impact of the oil nationalization, other than the fluctuation in crude oil output that followed.

Up to 1970, the crude oil value added in the NI was moving in line with the value added in the GDP. The gap between them, which can be explained by the profit share of the foreign oil companies, remained fairly constant. Following the 1972 nationalization measures, the oil value added in the NI was increasing at a faster rate than that in the GDP. This was because of the

sharp decline in the factor income to abroad from that sector due to nationalization measures. The increase in this item in the last two years may have been due to the compensation paid to the owners of the nationalized oil companies. In short, by the mid 1970's crude oil extraction and export financed some 60% of the GDP and more than one-half of the NI. This was a consequence of two groups of factors: first, the nationalization decrees which affected mainly the crude oil value added in the NI, making its share comparable with that in the GDP; and second, the increase in crude oil prices as well as the increase in output rate which had an impact on both values added in somewhat equal manner.

Table 3.2 Crude Oil Values Added in the GDP and the NI (ID in millions).

	1 GDP	2 Oil Value Added	3 2/1 %	4 NI	5 Deprec. in (2)	6 NFIA ⁺	7 Oil Value Added in NI	8 7/4 %
1960	565.3	208.0	36.8	437.1	8.7	95.1	104.2	23.8
1961	615.0	209.0	34.0	484.2	10.4	94.8	103.8	21.4
1962	658.4	210.2	31.9	526.4	9.4 ⁺⁺	95.1	105.6	20.1
1963	670.6	242.5	36.8	525.3	10.9	110.1	121.5	23.1
1964	689.1	266.9	38.7	620.3	12.0	126.1	128.8	20.7
1965	862.4	281.1	32.6	679.3	12.6	131.5	136.9	20.1
1966	933.1	298.5	32.0	736.8	13.4	139.9	145.1	19.7
1967	937.7	265.2	28.3	754.2	11.9	124.6	128.7	17.1
1968	1062.6	334.6	31.5	840.6	15.1	160.6	159.5	19.0
1969	1103.8	335.9	30.4	879.2	15.1	161.1	159.7	18.2
1970	1197.3	362.6	30.3	956.9	16.3	171.4	174.9	18.3
1971	1375.0	507.8	36.9	1081.3	17.3 ⁺⁺	220.1	270.4	25.0
1972	1388.8	400.0	28.8	1166.9	18.8	38.3	342.9	29.4
1973	1587.5	563.4	35.5	1412.1	20.5	98.5	444.4	31.5
1974	3347.7	2022.7	60.4	3002.5	22.7	383.1	1616.9	53.8
1975	3970.5	2279.0	57.4	3750.5	23.1	163.1	2092.8	55.8

+ Net factor income to abroad from the oil value added in GDP.

++ Depreciation is put at 4.5% of (2) between 1962-1970, and at 22% between 1971-1975.

Haseeb (1964); Sayigh (1978a); AAS (1974), (1975), (1976); IMF Vol. 15, 22 and 29.

As may be expected, the one-sided character of Iraq's economy can best be seen in relation to foreign trade and the balance of payment variables. As in other oil exporting countries, foreign trade, whether taken per capita of the population or in relation to national account variables, is quite high compared with that prevailing in other Third World countries.

The share of crude oil in the total visible export of Iraq was not less than 90% in any single year between 1960 and 1975. This share oscillated around 93% during the 1960's, having been about 95% at the beginning of the decade. But by the mid 1970's, non-oil export only represented less than 2% of export. The slight decline in the crude oil share in the total export during the 1960's indicates that non-oil exports were at that time growing faster

than oil export. However, as we have seen in relation to the oil values added, crude oil export recaptured its 1960 share by 1971.¹⁷

3.2.3 AGGREGATE DEMAND ROLE OF OIL REVENUES

By the term demand role is meant the share of oil revenues used in financing the various expenditure indicies. The oil revenues in Iraq are utilized through two channels: the development budget and the ordinary current budget. The division of the oil revenues between these two budgets is governed by successive decrees which reduced the share of the development budget from 100% in the early 1950's to 70% and then to 50% by the end of the decade. At present the 50% level is meant to be a minimum share.

During the period from 1961 to 1975, Iraq witnessed three five-year plans and one investment program. The detailed review and evaluation of these plans as well as the impact they left on the economy will be presented in the following chapter. Here we shall confine ourselves to pointing out the relative share of oil revenues in financing these plans.

The Law for each plan contained tables spelling out the anticipated amount of the revenues of the plan from various sources as well as the planned sectoral expenditure of these revenues. However, deficits were registered in the first two plans between the planned revenues and expenditure amounting to 25% and 16%.¹⁸ Some 75% of the planned revenues in the 1961-1964 plan was to come from oil revenues. Another 18% was to be financed by foreign loans. The corresponding ratios for the 1965-1969 plan were 70% and 17% and for the 1970-1974 plan 87% and 7% respectively.

Compared with these anticipated figures, the ratio of actual revenues to the planned revenues was 66%, 72% and 89% in the three plans respectively. The ratios of oil revenues in financing these actual figures were considerably higher than the planned ones, amounting to 82%, 93% and 90% respectively. Even in the 1975 investment program, the share of the oil revenues in financing the program rose from a planned 65% to an actual 92%.

Although actual revenues were consistently lower than the planned ones, actual expenditure was not only lower than the planned expenditure, but also lower than the actual revenue, as can be seen from the Table 3.3.

By the beginning of the 1960's, the development budget had a total unspent surplus of some ID 80 m. accumulated during the period from 1950 to 1959.

Since the unspent surplus continued to accumulate in the following period also, grants and loans to the current budget and various public institutions were financed by the development budget. It is difficult to specify these amounts because of the lack of data, but several references speak of large amounts and imply that these loans have never been repaid. Cf Mahdi (1977), p 171. During 1970 to 1975 for example, some ID 145 m. was drawn from the development budget as grants and loans, of which ID 25 m. were given freely to the current budget.

Table 3.3 Shares of Development and Current Budgets of the Oil Revenues (ID in millions)

	Development Budget			Current Budget		
	Actual Revenue	Actual Expend.	Oil Revenue	Actual Revenue	Actual Expend.	Oil Revenue
1960	47.8	45.5	47.6	103.6	114.3	47.5
1961	66.7	66.9	58.1	120.7	119.2	58.1
1962	70.0	59.3	50.5	114.7	128.4	48.5
1963	67.6	54.3	57.2	126.8	149.0	57.2
1964	76.5	75.3	64.8	145.9	180.1	64.8
1965	75.0	59.8	67.7	179.1	187.5	67.7
1966	70.8	82.8	61.2	158.6	192.4	61.2
1967	80.8	68.9	75.8	210.4	205.5	75.8
1968	87.0	64.4	83.1	220.4	241.9	91.6
1969	88.9	117.3 ⁺⁺	85.0	250.6	289.2	84.5
1970	111.2	78.1	97.3	292.6	303.4	114.4
1971	189.3	153.8	170.7	344.8	341.4	179.3
1972	135.9	128.5	109.3	270.5	345.3	109.3
1973	441.8	244.0	411.6	597.8	454.9	411.6
1974	661.7	576.4	600.8	1400.2	921.4	1123.3
1975 ⁺	1089.3	916.2	1001.1	896.3	753.3	n.a.

+ For nine months only, Apr.-Dec. 1975.

++ Of which ID 25 m went as grants to current budget and ID 10 m to finance the capital of INOC. In this year, the total accumulated surplus amounted to ID 53 m.

CSO (1972), The Provisional Framework (1970), Al-S'ady (1974), AAS (1976) and AAS (1979).

The share of oil income in financing the total revenues of the current government budget, as can also be seen in Table 3.3, fluctuated considerably during the period under review. Up to 1970, this share never exceeded 50%, but thereafter it rose at a very fast rate (apart from the 1972 setback), reaching some 75% in the mid 1970's. During the 1960's, revenues from oil were increasing at a compound rate of 6.5%, while the total current budget revenues increased at a rate of 10.2% per annum, i.e. revenues from other sources were increasing at a higher rate than oil revenues.

Expenditures were growing at an even faster rate. Therefore, a budget deficit was registered in most of the years during the 1960's. The accumulated

deficit between 1961 to 1969 amounted to some ID 175 m.

During the first half of the 1970's, with the exception of 1972, a new trend was in evidence. Oil revenues were increasing at a faster rate than total revenues, and the rate of increase of expenditures was lower than that of revenues. Therefore, the share of oil used in financing the current budget reached an unprecedented level, more than 80% in 1974, and a huge surplus was accumulated. By 1974 the total grant net deficit, which up until 1972 amounted to ID 282 m., turned into a net surplus of ID 340 m. Iraq's monetary reserves consequently increased substantially from 600 m. dollars in 1971 to 2730 m. dollars in 1975.¹⁹ No official figures for Iraq's investment, if they exist at all, are available.

To sum up, oil revenues were financing about all of the development budget and a larger share of the current budget. The current budget, however, was not content with its share of the oil revenues and was drawing loans and grants from the development budget. This tendency was witnessed throughout the period and may have been encouraged by the failure of the development budget to utilize and spend all the revenues that were actually allocated to it.

3.3 AGRICULTURE

The basic structural defect in Iraq's economy has been, and still is, highly evident in the agricultural sector. Even up to 1970, when about one-half of the economically active Iraqis were involved in the agricultural sector, the share of agriculture in the GDP did not exceed 17%.²⁰ The various studies of Iraqi agriculture have all emphasized two aspects: on the one hand, the great productive potential of the country; and on the other, the appallingly low productivity of the farmer, the abuse of land, the primitive nature of the techniques used and, until the late 1950's, the extremely uneven distribution of land ownership.

3.3.1 THE AGRARIAN REFORM

Iraq has been a classic example of uneven distribution of land property. An official agricultural census undertaken shortly after the 1958 revolution, reported that more than 60% of the total number of holdings consisted of 1 to 5 ha farms, covering only 8% of the total size of the holdings. At the same time, 1.2% of the number of holdings consisted of units that ex-

ceeded 500 ha, and covered some 60% of the total size of the holdings. The census had also counted nearly 525,000 landless peasants.²¹

The first Agrarian Reform Law in Iraq was issued two months after the July revolution. Law No. 30 of 1953 decreed the expropriation of all privately owned holdings exceeding 250 ha of irrigated land (or 500 ha of rain-fed land). The seized land was to be distributed to the peasants in plots having a maximum size of 15 ha of irrigated land (or 30 ha of rain-fed land). Compensation to the former landowners was to be paid out in 3% interest-bearing bonds for 20 years. The new owners were to pay the full purchase price of the holding over 20 years. (This was later changed to only one-half of the purchase price over 40 years.) The law established the Agrarian Reform Organization to carry out the expropriation and distribution measures within a five-year period (later extended to 10 years).

More than 3250 landowners in the country were affected. Furthermore, it was estimated that more than 3 m. ha would be subject to the conditions of the law.²² The implementation of the law proceeded at a very slow rate, especially with regard to distribution of the land. By 1964, the share of the distributed land to the cumulative size of sequestered and state land under the control of the agrarian reform authorities was 31%. It rose to about 50% in 1970. The number of families benefitting from the reform rose from about 46 to 76 thousand.

In May 1970 a more comprehensive and sophisticated agrarian reform decree was issued. Land-ownership ceilings were put at 15 different levels, ranging between 10 and 500 ha, while the size of the distributed plots were in the range of 1 to 50 ha, depending on soil, irrigation, level of rainfall and crop. No compensation was to be given to the former landowners, nor were payments to be collected from the new ones.

At the end of 1976, the total cumulative redistributed land amounted to about 1.9 m. ha, and benefitted about 223,000 families. At the same time, the Ministry of Agrarian Reform had temporarily under its direction a large area of seized but undistributed land. As late as 1976, the agrarian reform authorities had managed to distribute at most only 67% of the land under its control.²³

3.3.2 PRODUCTION AND PRODUCTIVITY

The wide fluctuations in the annual volumes of the major agricultural products in Iraq make statistical analysis difficult. Basically, the fluctuations are the result of the dependency of agriculture on changing weather conditions and the level of water flow. But they are also a result of the changing political conditions in the country in general, and in the northern fertilized areas in particular, as well as the drastic changes in the agricultural institutions following the agrarian reform measures.

Iraq's production of wheat, cotton and linseed increased substantially between 1950 and 1974, its output of rice remained about the same, while barley production declined sharply. However, since the mid 1960's, Iraq has become a net importer of major cereals. Iraq's production of wheat, rice and maize amounted in 1950 to some 800 thousand tons, of which 66 thousand tons were exported. In 1973, the country produced 1133 thousand tons of these three crops and imported a further 27 thousand tons.²⁴

The development of the output volume of the main groups of agricultural products as well as the sizes of the harvested areas are presented in the following Table.

Table 3.4 Index Numbers for Products Volumes and Harvested Areas
(1970 = 100)

	1962		1965		1968		1973	
	Prod.	Land in crop	Prod.	Land in crop	Prod.	Land in crop	Prod.	Land in crop
Cereals	75	79	83	87	112	102	120	88
Oil seeds	40	41	71	83	89	93	40	43
Bulbs	63	66	107	88	121	109	118	108
Legumes	66	73	82	82	98	99	74	83
Ind.crops	49	61	65	70	74	67	88	94
Vegetables	55	62	81	83	98	97	97	97

Yields are three-year averages centered on indicated date.
Planning Ministry (1976), pp 55-57.

The production increases, especially of cereals and vegetable products, are due more to yield increases than to increases in the size of the harvested land area.

A characteristic of Iraq's agriculture is the low productivity per unit of harvested land. Although some improvements have taken place since the 1950's, it is still relatively low and widely fluctuating, as can be seen from Table 3.5.

Table 3.5 Yields and Cultivation Shares of Selected Crops

	Share in total harvested area 1971	Yield in kg. per ha.				World average kg. per ha. 1972
		1950	1960	1971	1975	
Wheat	46.4	480	513	761	765	1628
Barley	17.8	910	777	1082	934	1793
Rice	2.0	1110	1373	2742	2895 _a	2251
Cotton(Lint)	1.6	140	233	248	278	1097
Tobacco	0.4	720	900	716	904 _b	1156
Grapes	0.4	3000	3000	3000	n.a.	5246
Broadpeas	0.4	810	1023	970	996 _c	1137
Lentils	0.3	587	617	484	829	689
Onions	0.3	5000	5500	6079	7070 _c	11,343
Chickpees	0.2	600	537	647	577	637
Maize	0.1	640	603	1374	2416	2785

Yields are three-year averages centered on the indicated date.

_a: 1974; _b: average for 1972, 1974 and 1975; _c: average 1973-1975.

Askari and Cummings (1976), pp 61-65 and AAS (1974), (1975), and (1976).

Because of the lack of statistics, it is difficult to give an estimate of the productivity of the agricultural laborer, either with respect to crop and type of soil or even in general. However, there are several reasons for believing that this productivity is not only low, but also is rapidly declining. It was estimated that the average productivity of agricultural workers declined between 1974 and 1975 by ID 3, and that the marginal productivity was as low as minus ID 118.²⁵

There are a number of factors which adversely affected the agricultural development policy of Iraq: first, natural factors, including the very harsh weather conditions, the drastic decline in the flow of surface water caused both by natural effects and by the intensive utilization of the rivers' waters by the neighboring countries, and finally, the geographical structure of the irrigated zone which accelerates the problem of soil salinity; second, institutional and political factors which include the great

concentration of land property before 1958 and the frequent changes in the agrarian reform measures, the slow-down of their implementation, the insufficient attention paid to cooperatives and the generally poor quality of the administrative cadres. Add to this the frequent political changes and the even more frequent alterations in agrarian policies, the inadequate and per-meative irrigation systems, and the catastrophic negligence of drainage problems.

As stated earlier, of approximately 10.6 m. ha. cultivable land in Iraq, only about one-quarter of it is under actual crop, i.e. less than 12% of the land area of the country. Theoretically, therefore, the land in crop can be substantially increased. Moreover, since some 60% of the cultivable land lies in the irrigated zone, the portion of this relative to the rain-fed zone can also be increased.²⁶ What seems to be more crucial for the time being, however, is to concentrate on measures that will help to improve the productivity and which will stop the salinity and alkaline from claiming even more land in the irrigated zone. As early as 1959 it was reported that around 25% of the irrigated zone was lost to production because of these problems. Recently it was estimated that no less than 20,000 ha. are lost every year because of salinity and alkalinity.²⁷ The origin of the salinity problem is certainly to be found in the natural conditions. But the use of primitive irrigation methods accompanied by an ignorance of drainage requirements and the "over-optimistic attempts at irrigation on the extensive margin" have intensified the problem to its present catastrophic proportions.

3.4 INDUSTRY

"Industrialization holds an almost mystical fascination for much of the under-developed world. Iraq is no exception."²⁸ Since the turn of the century, the Iraqi industry has been expanding and growing more sophisticated while, at the same time, becoming more and more government controlled. Its share in the GNP, about 10%, has remained stationary during the period from the late 1950's to the early 1970's. At the end of this period, industry was employing only about 5% of the labor force.

The first industrial census in Iraq refers to the year 1954. It was estimated at that time that there were 22,460 industrial establishments in the country. 45% of these were one-man shops, and only 1% (i.e. 294 companies) employed 20 persons or more. The industrial labor force was put at 90,300

(the 15,250 oil workers were excluded).²⁹

3.4.1 THE EMERGENCE OF THE PUBLIC SECTOR

The Industrial Bank, a government bank founded in 1946 in order to encourage industries by providing loans and participating in the equity capital of companies, was the major financial institution backing the industrial companies in Iraq up to the early 1960's.

Dr. F. Jalal, director general of the Industrial Bank, noted in his well-documented research, that two basic elements had characterized the activities of the Bank during that period: first, the Bank relinquished its right to found its own companies and participated with less than half of the capital of the private companies; second, the main activity of the Bank favored the relatively large-scale companies. The Bank was becoming increasingly concerned in the return of its invested capital, sometimes at the expense of its other declared aims.³⁰

In 1964 there were 1262 industrial establishments registered in the Union of Iraqi Industries. Only 14 of them were public, representing about 26% of the total capital formation (excl. the investment of the oil companies) and employing 11% of the total number of employed for all these companies (about 53,000).³¹

The public sector, in a more real sense, was created by an unexpected nationalization decree in 1964, the decree of the 14th of July. It nationalized 30 industrial and commercial companies, as well as all national and foreign banks and insurance companies. Insurance, banking, as well as some sub-industrial sectors (e.g. cement production and cigarettes) were monopolized by the government. The import of any commodity the government wished was also monopolized.

An upper limit to individual ownership in companies was established, and 25% of the companies' net profit was allocated to be distributed to the workers. Those companies whose paid capital exceeded a certain limit were forced to become share companies. Finally, the income tax law was sharpened. The former owners were to be compensated in 3% interest-bearing state bonds with a 15 year pay-off period. 25% of the net profits of the companies was allocated for this purpose. Also, an economic organization was founded to own and operate the nationalized establishments.

The nationalized companies had a total nominal value of ID 26 m., of which ID 3 m. belonged originally to government agencies (i.e. the Industrial Bank). Three of the nationalized companies were commercial, while the remaining 27 were processing and manufacturing companies. Only two of these companies had a paid capital exceeding ID 2 m., while 15 of them had a paid capital of less than ID 0.5 m. The 1964 nationalization decree raised the public sector's share in Iraq's non-oil industrial capital formation to 35%.

Several decrees have been issued since 1964 to organize the public sector. Law No. 90 of 1970 divided the General Organization for Industry (which is under the authority of the Minister of Industry) into five sections, representing the major industrial branches. Each public company was to be supervised by an advisory committee, which was in turn connected with one section of the General Organization.

3.4.2 PERFORMANCE AND CURRENT FACE

There are conflicting opinions as to whether or not the nationalization of the "large" industries in Iraq brought about improvements in output, productivity and investment. The available data for the period prior to nationalization and immediately following it are too poor and conflicting to allow an objective judgement.

As one might expect, the 1964 nationalization decrees coupled with the lack of a clear governmental policy and drastic political unrest had discouraged the private sector. Since then, industrialization has been tied, almost exclusively, to the public sector, and has been carried out through the development plans.

Iraq's industry suffers from a number of well-known and common problems. Productive capacity is under-utilized because of the lack of necessary inputs, of markets and of technicians. Frequent changes are made in administration and programs. Economic feasibility studies are insufficient or lacking. There are shortages and delay in providing spare parts. Costs for local resources are rising excessively and there are shortages of semi-qualified labor in general and skilled labor in particular. The products are generally of poor quality and competitiveness.

Two basic problems are of special importance here: the administrative problem and the problem of low productivity. Several institutional changes were made after 1964 in the organization of the administrative body of the nationalized

and newly established companies. Despite the changes, however, the industrial enterprises remained organized within the state bureaucracy with limited autonomy. Considering the general inefficiency of the Iraqi bureaucracy and the frequent turnover of personnel which further accelerated the efficiency problems, the poor performance of these state-run enterprises is not surprising. Nearly all decisions had to pass through several levels of authority. This gave the enterprises very small margins for flexibility in meeting market conditions with respect to prices, production or sales. Add to this the heavy burden these companies bore because of the government's employment policy which tended to shelter all the unemployed regardless of qualification or actual need for them. Measures such as purchase of input, import, transfer of workers, changes in product and other adjustments were subject to lengthy procedures. "Delays are long, and are made longer by the reluctance of officials to assume authority."³³ Therefore, even when authority is granted to some high officials, it seems safer to them not to make decisions rather than to make the wrong ones. The resulting loss in time and resources are great.

It is clear that the problem of productivity is related to the problem of administration. In recent years, however, this problem have been receiving greater attention, and in 1976 a general campaign was launched to study and rectify the problem of low productivity. The inflexibility of the labor laws and the administrative machinery as well as inappropriate wage policies, low incentive, poor production planning, the lack of spare parts, inputs and coordinations were seen as some of the causal factors.³⁴ It was estimated that the average utilization of the productive capacity of the Iraqi industries in 1979 was only about 62%.³⁵

By 1975 Iraq's industrial sector consisted of 1349 large enterprises (i.e. employing more than ten workers each), employing a total of 134,600 workers. About half of them employed between 10-19 workers (95% of these companies being privately owned). Companies employing more than 200 workers represented only 7.5% of the total (76% of which belonged to the public sector). In the same year, the total value added of industrial output was ID 436 m. The public sector employed and produced some 70% of the sector's employment and output. The value of food, beverages, textiles, clothing and leather products amounted to some 55% of the output value of both the public and private companies. 11% of the public sector's industrial companies were specialized in chemicals and oil products, producing some 20% of its output value.³⁶

The mixed sector consisted in 1977 of 18 companies, with a total capital of

ID 24 m. This sector produced some 4% of the total value of industrial output and earned ID 10 m. in profit. It has been suggested that the growth rate in the value added of the mixed sector was higher than that achieved by the public and private sectors.³⁷

3.5 THE INCOME DISTRIBUTION

A main problem here is that the lack of data will not allow us to trace the effects of land reform and industrial nationalization measures on the state of income distribution. Actually, even the more recent and apparently sophisticated data used in the following discussion should be treated with some reservation.

Using the data collected in a sample survey of the Iraqi household budget carried out by the Central Statistical Organization in 1976, the following Table could be constructed.

Table 3.6 Income Distribution per Iraqi Household Unit in 1976

Income Groups per month	Units			ID			%					
	Household			Monthly Income			Household			Monthly Income		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
1 - 15	12	8	20	11.9	12.6	12.4	0.5	0.7	0.6	0	0.1	0.1
16 - 20	7	19	26	20.0	19.0	19.4	0.3	1.6	0.7	0	0.4	0.1
21 - 30	41	85	126	27.8	26.1	26.6	1.7	7.0	3.5	0.3	2.2	0.8
31 - 40	78	136	214	36.4	40.0	38.7	3.3	11.2	5.9	0.9	5.4	2.0
41 - 50	132	159	291	50.3	46.3	47.9	5.5	13.1	8.1	2.1	7.3	3.3
51 - 70	372	265	637	69.8	64.9	67.6	15.6	21.8	17.7	8.1	17.0	10.4
71 - 90	413	212	625	94.0	89.7	92.4	17.3	17.4	17.4	12.1	18.8	13.9
91 - 110	379	135	514	112.7	101.3	109.3	15.9	11.1	14.3	13.3	13.5	13.5
111 - 130	262	64	326	141.5	131.2	139.3	11.0	5.3	9.1	11.1	8.3	10.0
131 - 150	187	48	235	152.9	152.4	153.0	7.8	4.0	6.5	8.9	7.2	8.7
151 - 175	165	33	198	186.1	189.1	186.5	6.9	2.7	5.5	9.6	6.1	8.9
176 - 200	113	15	128	223.5	203.6	220.2	4.7	1.2	3.6	7.9	3.0	6.8
201 - 250	105	20	125	270.8	248.9	265.7	4.4	1.6	3.5	8.9	4.9	8.0
251 and more	119	16	135	436.9	342.8	423.3	5.0	1.3	3.8	16.2	5.4	13.8
	2385	1215	3600	134.3	83.0	115.1	100	100	100	100	100	100

Constructed on the basis of data provided in CSO (1976b).

The survey covered a sample of 3600 household units, 2385 of which lived in urban areas and 1215 in rural areas. All the governorates of Iraq were represented. A household was defined as being "one or more persons managing together their living and earning and all other necessities of life".³⁹

A number of important observations can be made in the above Table. The income gap between the top and bottom income brackets is in the order of 27:1 for the rural households and 37:1 for the urban ones. This is surprising. The fact that self-produced and consumed goods had been evaluated and added to the incomes in the rural households may partly explain the wider income gap in urban areas. However, when the income gap between the top three and the

bottom three income brackets are compared, the differences between the rural and urban areas diminish, and the ratio approaches 15:1 in both sectors. It can also be seen in the Table that about 75% of the households in the rural areas earn a monthly income of between ID 31 to 110, and that about 89% of the urban families earn more than ID 51 per month. Also, while 14% of the urban households earn an income that exceeds ID 176 per month, less than 4% of the rural families do. The considerable gap between the rural and urban living standards would probably be even wider if individual living standards were considered. The average size of the urban family was 7.6 persons, while that for the rural families was 8.1

The data presented in the previous Table can be used to delineate the overall income distribution in Iraq. The following Table has been derived for that end.

Table 3.7 Percentage Distribution of Iraqi Household Units and Income 1976.

Deciles of households		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Income share in %	Non-cumulative	2.7	4.3	5.8	6.6	7.9	8.8	9.9	11.9	15.2	26.9
	Cumulative	2.7	7.0	12.8	19.4	27.3	36.1	46.0	57.9	73.1	100

The households in Table 3.7 are divided into ten equal sub-groups, each of which represents 10% of the total. The sub-groups range from the poorest to the richest families. As can be easily seen from the Table, the income distribution in the country, although not strikingly unequal, has a bias in favor of about 20% of the population. When the data are compared with similar figures constructed by ISSA (1979) for the year 1971, it is not possible to trace significant changes. A five-year period, however, is too short a time to expect structural changes in the income distribution. Nevertheless, there seems to be a trend towards an increase in the share of the middle-income groups at the expense of the high-income groups. But, in spite of the improvement in the middle class' share of income, up to 1976 the richest 10% of the Iraqi households earned about as much as the poorest 50% earned together.⁴⁰

3.6 THE POLITICAL MANAGEMENT

Iraq was established as a political entity in 1920. The borders of the country as well as the ethnic origins of its inhabitants were the products of compromises made by the foreign forces that carved it out. These two factors

represent the major political constraints in the modern history of the country, and make Iraq "notoriously difficult to govern". The border disputes between Iraq and her neighbors are chronic. Its population is fragmented into intersecting ethnic, religious and sectorian groups, and the Iraqi national identity has taken a long time to develop.⁴¹ The British, when appointing Faisal King in 1921, were anxious to create a national élite who would benefit by, and therefore have an interest in, preserving the system. This aim soon materialized, and a political élite consisting of the royal family, former Iraqi officers in the Ottoman army and the tribal leaders came into being. A natural second step was to force through the necessary legislation to assure the transformation of the ruling élite into a ruling class. It was hoped that Iraq would, by this, establish a precedent in the region. But once again, that very transformation had created "the social forces which were to bring the whole system down in 1958".⁴² The pre-1958 ruling élite had never enjoyed any degree of stability. The personality conflicts among its members, the British interference in the country's economic and political affairs and the social tensions created by the great concentration of wealth and the ruthless measures against opposition had resulted in severe political unrest in the country.⁴³

The 1958 revolution brought about a new élite and a realignment within the power struggle from which the army officers emerged the victor. And as always, once an army leaves its camp, it takes a long time before it will once again accept a non-direct political role. The frequent cabinet changes and the socio-political unrest that characterized the monarchy's rule were replaced by no less frequent but far more bloody military coups under the republic. In both cases, of course, the Iraqi economy was paying the costs.⁴⁴

The effects of political unrest on the performance of any economy are well known. These effects become even more damaging if the country is attempting to undertake some form of economic planning where the public sector plays an essential role. The continuous interruptions of the plans, the placing of blame for the economic problems on the "previous regime's" general mismanagement of political and economic affairs, the increasing problems of inefficiency of the public employees, and the discouragement of private investment are some of the consequences of the political changes that have been occurring in Iraq.

With each new cabinet, a large number of senior civil servants were removed. Since Iraq had a severe shortage of qualified personnel, this caused the

country serious problems. In such an atmosphere of distrust and fear, it is only natural to expect that the politically loyal employee would be "preferred to the able but politically passive... The employees feel that their advancement depends on their chances for political or personal favoritism rather than on their ability".⁴⁵ The seriousness of this problem was noted in an IBRD report which considered the poor administrative capacity to be "the most crucial element in Iraq's development effort".⁴⁶ The need to fill posts by loyalists had often led to the appointment of inexperienced, unqualified personnel in highly sensitive economic positions. In addition, policies were continually being interrupted or replaced by contradictory ones, premature and untested economic measures were introduced, decrees were frequently enforced in the hope of acquiring immediate political gains, but which had long-term damaging effects on the economy.⁴⁷

In addition to the internal political and economic turmoil, there was the chronic war between the central government and the armed Kurdish movement in the northern region. The war with the Kurds was running on an open scale throughout the 1960's and up to 1975, with but a few short-lived intervals of peace. It was only recently reported by the Iraqi president that more than 60,000 Iraqis were killed or wounded in that war during the period from March 1974 to March 1975.⁴⁸ The material losses must have been tremendous. The Arab-Israeli conflict as well as disputes with neighboring Arab countries have caused more than one shut-down of the Mediterranean pipelines, all of which have had disastrous effects on the economy.

After two coups occurring in rapid succession, the Arab Socialist Baath party once again came into power in 1968. Since then, Iraq has experienced relative political stability.⁴⁹ The IPC nationalization measures; the alliance with, and/or strong measures against, rival political groups and parties; the Kurdish self-rule formula; the firm control over the armed forces and the numerous other mass organizations; and finally, the huge increase in oil revenues, all have helped the Baath party to achieve that stability.

The Baath is an Arab national party, founded in Syria in the mid 1940's. Theoretically, the party has a pan-Arab organization with regional branches in the various Arab countries. In reality, however, the party has been split into rival regional fractions and branches since the middle of the 1960's.

The Revolutionary Command Council (RC) represents the highest authority in the country. In 1977 the RC was enlarged substantially, which consolidated

the position of the civilian section in the party at the expense of the military one. The temporary constitution of 1970 vested considerable executive power in the president, elected from and by the RC. In 1980 the Iraqi elected their first National Assembly since the revolution of 1958. It has limited power, a characteristic which is shared by the ministers who act as department heads with executive functions only.⁵⁰ Since its establishment, the party has included "socialism" in its main slogan (after Unity and Freedom). Although the content of Baath socialism has undergone repeated alterations, it is still difficult to give it a firm definition, especially with respect to economics.

Development and industrialization are closely related concepts in the Baath literature. Development should aim at securing all the basic needs of every citizen in the society. To achieve this end, special interest must be paid to industry, the only sector which can provide long-term employment opportunities for the people and contribute to the socialist accumulation. "The industrial sector, therefore, will remain the leading one in our calculations for establishing the material basis for socialism."⁵¹

The Baath program, vague as it is, provides nevertheless a general prescription for economic transformation. The state ownership and control of the country's natural resources, major industries, transportation, communication and banking systems are among its provisions. Land reform and state farms in agriculture and workers' participation in managerial procedures and profit-sharing in industry are practiced. Otherwise, free, "non-exploitive" enterprises are permitted, though within the "general objectives of socialism" and subject to the "short-term dictates of politics". The encouragement of private investment is not emphasized. This is because Iraq does not "suffer from strategic bottlenecks in its socialist system such as to be in need of these types of measures".⁵²

The president has also elaborated on the role played by oil revenues in Iraq. "Oil revenues are Iraq's national qualitative weapon. This is reflected even in our ideological thinking and in our calculation for the (development) stages... Oil provides us with huge investment means, which allows our calculation for the horizontal expansion of the socialist sector to take a special way, i.e. capital availability is not our prime concern."⁵³

In practice, the economic decisions made in Iraq are not always in accordance with the adopted economic policy and the economic orientation of the party. "One must take into account the psychological effects of the nominal living

standard of the people in the neighboring oil-rich states," to mention just one factor. Flexibility and momentum must be kept in balance until the strategic goals of the party are achieved. Therefore, "what could be accomplished in five years, would perhaps be more conveniently undertaken in seven".⁵⁴

CONCLUDING REMARKS

Compared with other underdeveloped countries, including the oil-rich states, Iraq possesses favorable general conditions for development. It is relatively rich both in oil and in water supply, it has relatively large cultivated and potentially cultivated land, and a fairly large population which, so far, does not entail any excessive burden on its resources.

These generally positive prerequisites cannot be expected, however, to operate by themselves, nor are they without certain defects. As in other underdeveloped economies, the manpower represents but a small portion of the total population. The high illiteracy rate also gives an indication of the low qualification level of the labor force. The productivity is therefore fairly low and the administrative capacity is generally poor.

The agricultural sector is still largely dependent upon poor and unreliable rainfall. The historical lack of attention to the drainage question in the irrigated zone coupled with harsh weather conditions has resulted in raising the salinity of the soil to a catastrophic level. In spite of an appreciable improvement in some aspects, the country is becoming more and more dependent upon imports to feed its people. Furthermore, the agricultural sector still embodies one of the major structural defects in the Iraqi economy, namely, the huge gap between the percentage of the population which earns its livelihood from agriculture and its percentage share in the GDP. Environment and weather conditions can only bare some of the blame. The lack of comprehensive agricultural policies and the long-time mismanagement of agrarian affairs have brought the situation to its present catastrophic state. The destruction of the old feudal institutions without providing at the same time workable alternatives, the use of primitive irrigation techniques and farming methods, the lack of qualified personnel in administration and in the field, and the lack of stability due to frequent changes in regulations, personnel and measures are among the factors that have negatively affected that sector.

The industrial sector has not yet been able to increase its share in the GDP to any great extent. In spite of the overall expansion of this sector that has taken place, its traditional bottlenecks remain intact: utilization far short of full capacity and low productivity. In this case, natural conditions play hardly any role, but rather the poor protection and price policies that were adopted and are thought to have misled the preliminary feasibility studies made on industrial projects. Questions concerning organization, coordination of projects, qualified personnel and incentive policies also play an important part. Once again, political unrest in the country proved to be severely harmful to the performance of the industrial sector.

The country's revenues from oil have increased substantially. The oil revenues were about the only source of financing for the development plans' budgets, and were financing more than one-half of the government's annual current budgets. The oil revenues also had a dominant share in financing the GDP and the foreign exchange earnings. Everything seems to indicate that these ratios are going to increase rather than decrease. In fact, Iraq is in the midst of a dilemma, for, while the country's expressed goal is to become less dependent upon oil revenues, the ambitious investment programs as well as the increases in current government spending require the promotion of oil export. The point to be seen, however, is when will the invested oil revenues start paying back and when can oil revenues decline in absolute or relative manner without adversely affecting the living standard? It is important to note that the country has apparently had no specified oil production policy. Nor was it possible to trace any indication in this respect from government publications other than the president's slogan that one of the last two barrels of oil produced in the world shall come from Iraq.

It has been claimed by McLachlan that the "Iraqi environment is not easily controlled" and that "Given a simpler option to sustain the country on oil income, it is hardly surprising that Iraqi governments are permitting the country to become an oil economy on a model not entirely different from that more maturely developed in Kuwait".⁵⁵

This option is perhaps easier, but hardly better. The creation of a pure oil rentier economy, living on the consumption of a large share of oil revenues now and the interest on its foreign portfolio after final oil exhaustion, is not a serious - or even possible - option for Iraq. Actually, it is not a serious option for any other country either. The Iraqi policy-makers have frequently declared that their aim is to establish a self-sustained developed economy independent of crude oil exportation. Naturally, this end has not yet been achieved. On the contrary, the country has become increasingly

dependent upon oil revenue. Nevertheless, the non-oil productive capacity of the country is expanding considerably, and there is no apparent reason for assuming that it will stop doing so in the future. It is one thing to ascertain that the economy is suffering from some very serious defects. It is quite another to claim that the economy is totally unmanageable. If the Iraqi economy, in spite of all its advantages, cannot "make it", then it is hard to see how any other underdeveloped country will be able to achieve development either.

NOTES

1. Sayigh (1978a), p 25 and Edens (1979), p 8.
2. AAS (1973), p 145. The flow of the rivers varies considerably from year to year. The figures for 1972 are the highest during that decade.
3. AAS (1975), p 36.
4. UN Studies (1970), p 79 and The Provisional Framework (1970), p 45. Law No. 92 from 1978: The National Comprehensive Campaign for Compulsory Education of Illiteracy. A sum of ID 66 m. was allocated for this campaign.
5. UN Studies (1975), p 27 and AAS (1973), p 358. Khalil (1980) cited the figure of 2.3% as the percentage of women in the Iraqi labor force. P 5.
6. Oil & Gas Journal, No. 35, 1977, AAS (1972) and Al-Ghazzi (1976), pp 40-42. A large percentage of the utilized gas is used in the pump stations along the oil pipelines. About 20% of the utilized gas, i.e. 6.6 b.cubic ft., was consumed by households.
7. The Oil Ministry (1977), p 19.
8. Al-Thawra, 27.5.1979.
9. UN Studies (1962), p 2 and The Royal Institute (1953), p 98.
10. The IPC's investment up to 1962 amounted to some 650 m. dollars. See Issawi & Yeganeh (1962), p 87 and Mikdashi (1966), p 203. For the years 1963 to 1970, see Hashim (1972), p 5. The fixed assets of the IPC in 1960 were estimated by Mikdashi as being 440 m. dollars, 2% going to survey and development, 18% to oil fields and as much as 80% to pipelines property.
11. Arab Directory (1979), p 115.
12. Oil & Gas Journal 1950 and 1976. Proved reserve was defined by the API as: "The quantities of crude oil which geological and engineering data demonstrate with reasonable certainty to be recoverable from known reservoirs under existing economic and operating conditions." Two other kinds of reserve correspond to the API definition, prospective and undiscovered potential. The latter category of reserve is often estimated on the

basis of "the drilling-gap theory". See *The Petroleum Economist*, Oct. 1978, p 406. Most of the OECD members have recently adopted a terminology which distinguishes between reserves and resources: "Resources include reserves, but also that portion of a nation's potential economic endowment that has not yet been discovered." The estimation of oil reserve is rather complicated and often speculative because of the different geological, technical and economic factors that must be considered. Added to this is the fact that oil is a strategic commodity, and information concerning it is considered to be national secrets in several countries.

13. C f. Drake (1974), p 453 and 461, Adelman (1972), p 72 and Edens (1979), p 15.
14. Arab Directory (1979), p 124. This figure includes crude oil, gas and oil products pipelines. It also includes the length of the pipelines extended in the neighboring countries.
15. Local consumption of oil-refined products amounted then to 560,000 tons, i.e. some 11,200 bbl/day. By 1976 this figure was as high as 92,300 bbl/day. This represents little more than 90% of what the country produced of refined oil products in that year. See Langley (1960), p 214 and Arab Directory (1979), p 122.
16. The Oil Ministry (1977).
17. AAS (1976), p 398 and Table 3.1. The net invisible trade balance (excl: oil) was negative throughout the period. The net share of oil revenues in financing the total foreign exchange earning of the country was oscillating around 75% during the 1960's, but increased in the 1970's to approach 92%. IMF vol. 15-29.
18. The data for the National Plan 1970-1974 refer to the amended form of the plan. If the annual investment program of this plan were considered, it would be found to contain a deficit of 10%. Law No. 70 (1961), No. 87 (1965) and No. 158 (1971). AAS (1976), pp 269-280.
19. OAPEC (1977).
20. FAO (1974). The agricultural share in the GDP declined by 1977 to 8%.
21. Askari & Cummings (1976), p 155 and 157. Warriner (1957), p 140, quoted the following figures for the early 1950's: 20% of a total of 125,045 holdings was under one ha., while 104 holdings were more than 5000 ha. each.
22. Hasan (1966), pp 50-51.
23. AAS (1975), pp 94-103 and AAS (1976), pp 111-116. The agrarian reform figures of 1975-1976 represent considerable improvement over figures from earlier years. The fast implementation of the reform in the Kurdish areas in 1975 may account for this. It should also be noted that not all the confiscated land is cultivable. The 1970 Law resulted in confiscation of 1.5 m. ha. by 1975, some 85% of which was cultivable land, and some 60% originally state land.
24. This is based on the FAO estimations, as quoted in Askari & Cummings (1976), p 183. Iraq's import of agricultural products fluctuates with

its own production. A generally increasing trend can be seen, however, being as high as 32% annually between 1968 and 1974. In the latter year, agricultural imports had a total value of ID 70 m. See Hasan (1977), p 82. It is perhaps of interest to know that Iraq is the largest supplier of dates in the world (480 thousand tons in 1970). Up to the mid 1930's, dates were the largest single item of export in Iraq. Soon crude oil was to occupy this place, but dates remained the largest single non-oil export product.

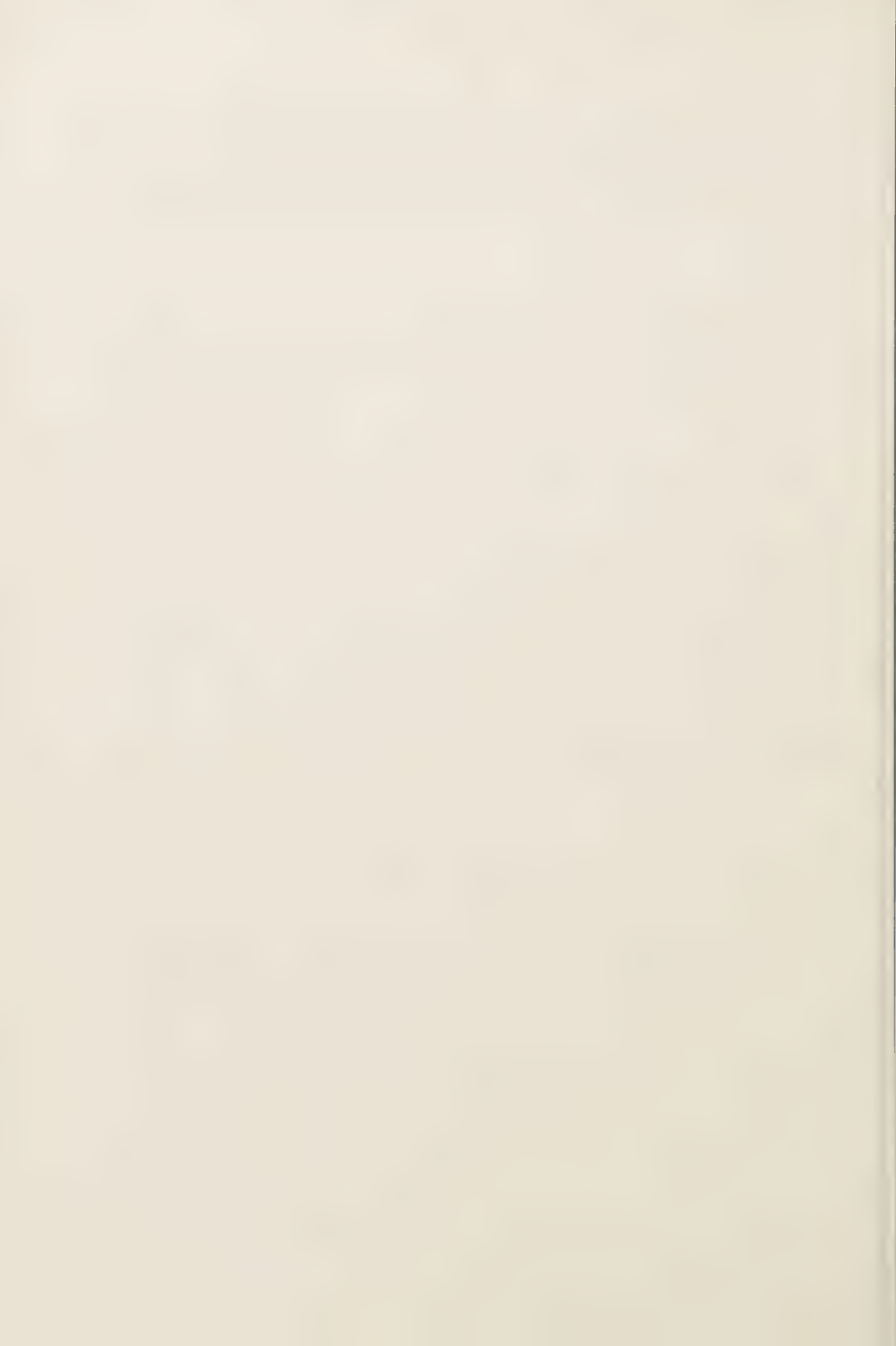
25. Hasan (1977), p 79.
26. McLachlan (1980), pp 144-145 and Sayigh (1978a), p 30.
27. McLachlan (1980), p 136 and 146. A report by FAO (1959) stressed the danger of the problem: "A sound system of irrigation, especially of intensive summer irrigation, represented a daily threat to the productivity of the soil... irrigation may ruin the land by salination if systematic drainage is not carried out". p 128. It was estimated that 70% of the irrigated area was actually threatened. "More land went out of cultivation every year, largely because of poor drainage and the consequent salinization of the soil." Penrose (1976), p 453. The Penroses, by comparing the sizes of agricultural holdings in various census, concluded that Iraq had lost at least 600,000 ha. between 1952 and 1972. P 455.
28. Langley (1961), Preface. To quote a more sophisticated view: "The philosophy of Arab revival, whether in Arab unity, in foreign relations or in internal reforms, is a philosophy of power. Industry is a source and symbol of power, it will be sought and promoted without due consideration to profitability or the best use of resources. Political decisions in these matters will have priority over technical decisions." Badri (1959), p 35.
29. Langley (1961), pp 58-59.
30. Jalal (1972), pp 92-100. The Penroses (1976) stated simply: "An industrial bank had been created very early to make loans to industry, but its finances were grossly inadequate and its policies were extremely conservative.", p 178.
31. Al-Haffez (1971), pp 91-92.
32. The Iraqi nationalization law followed closely the Egyptian nationalization pattern, which had taken place a few years earlier. It is widely believed that the Iraqi nationalization was carried out purely for political reasons, e.g. to create a certain degree of homogeneity with Egypt in a striving towards political unity.
33. Penrose & Penrose (1978), pp 471-472.
34. Al-Thawra Newspaper, Sept. 8, 9 and 10, 1976.
35. Oil & Development Magazine (1978), p 110. Al-Kurayshi (1978) maintained that the limited size of the market is a basic reason behind the short utilization of productive capacity and that this cannot be overcome by the increase in per-capita disposal income. On the other hand, he blames the type of custom duty applied and pricing policies for weakening the incentives and encouraging the establishment of productive capacities larger than what could actually be justified, especially in the consumer goods sector. This view was refuted by the editorial board of Oil &

Development Magazine. They quoted instead some of the reasons behind the inefficient utilization and deficit in the industrial establishments, which included unnecessary spending and employment, the absence of productivity criteria, the lack of qualified labor and administrative personnel and the lack of maintenance works.

36. AAS (1976), pp 123-138.
37. Jalal (1972).
38. In his attempt to identify the social classes that benefitted most from the growth of income during the 1960's, Mahdi (1977) relied on rather speculative data concerning the personal salaries of various provision groups. He concluded that the main group which benefitted from the national income increase during the period 1960-1969 was the public employees. Pp 28-32.
39. CSO (1976b). The Introduction. Each unit in the sample was covered intensively for five months during 1976. The reported results represent the annual figures divided by 12 months.
40. A rough estimation of income distribution can be made on the basis of national accounting data. In 1975 some 66% of the active labor force (excluding agriculture) were employed in industry, construction, transport and trade sectors. Those 66% received only about 34% of the total labor compensation paid out in the economy (excluding agriculture). The other service sectors which employed about 30% of the active labor force, received in contrast about 61% of the compensations. The latter group participated, however, in only about 15% of the GNP (excluding agriculture). See Hasan (1977), pp 81-82.
41. Maar (1980), p 30. In terms of religion, the Iraqis are divided between 84% Muslims and 16% Christians and several other religions. The former group consists of about 60% Shii and 40% Sunni. Mansfield (1973), pp 312-313. In terms of nationality, 15-20% of the Iraqi are Kurds.
42. Pool (1979), p 84.
43. In the period between 1921 and 1932, Iraq has had 14 different cabinets. Although numerous, the changes in the following period up to 1958 were not so frequent. Penrose (1978), p 55.
44. Between 1957 and 1962, Al-Quzzaz (1969) registered more than 265 armed actions in Iraq. These were defined as violent actions involving an organized group or with weapons used against the government or against other groups in the society. The study counted only six such actions during the period from 1948 to 1956.
45. Amin (1974), p 46. During the four-year period 1964 to 1968, Iraq has had eight ministers of industry, six ministers of planning, seven ministers of public works and six ministers of agrarian reform.
46. Cited in Jalal (1972), p 29.
47. Cf Amin (1974), p 44.
48. Al-Thawra, 18.9.1980.
49. Stability, but only in the sense of the continuity of some of the major

figures in the system. In the period from 1968 to 1980, Iraq's external relations with a number of neighboring countries deteriorated considerably, a state of warfare with Iran broke out, and there were reports of renewed fighting in the north. Furthermore, a period of collaboration between the Baath and the Iraqi-Communists came to an end, and finally, power struggles within the ruling party itself resulted in at least two bloody attempted coups.

50. Maar (1980), p 31.
51. Hussain (1977), pp 12-14.
52. Hussain (1979), p 14 and Iskander (1980), p 187. C f Edens (1979), pp 35-36.
53. Hussain (1977), pp 48-49.
54. Ibid, p 30.
55. McLachlan (1979), p 149.



4 THE DEVELOPMENT PLANNING

INTRODUCTION

After having described Iraq's oil situation and economic setting, shedding some light on the basic characteristics and problems of the country's productive capacity, we shall now proceed to elaborate on its development planning experience. According to Hashim (1975), development planning in Iraq can be divided roughly into three stages. The first stage, beginning in 1950, came to an end with the 1958 revolution. The second lasted throughout the 1960's, during which time the "idea of planning as an integrated set of targets was conceived". The third stage began in 1970, the year that marked "the beginning of efforts towards a comprehensive plan with well-integrated social, economic and physical targets and time-bound programmes".

In this chapter an attempt shall be made to shed light on the approach, formulation methods and implementation of development planning in Iraq. Along with a review of the planned targets and those actually achieved. We shall try to show that there were discrepancies between what the planners considered as constraints and what were the actual binding factors that affected the implementation of the programs. This will be of importance later in the study when absorptive capacity and its determinants will be discussed. Furthermore, on the basis of our description of the Iraqi economy and the analysis of its planning experience, we shall propose an alternative oil production strategy.

The present chapter is divided into four sections. The first section deals with the programs that were designed for the country in the period prior to 1960. The remaining sections deal with the three development plans that were applied during the period from 1961 to 1974.

4.1 THE DEVELOPMENT EFFORT 1950-1960

It was the availability of funds rather than the lack of them that stimulated the development efforts in Iraq during the early 1950's. It was decided at that time that all oil revenues were to be spent on development projects. For this end a semi-independent governmental body, the Development Board (DB) was

established. The activities of the DB, which came to an end with the July revolution of 1958, were valuable in that they helped to expose some of the basic bottlenecks that even today still impinge on the Iraqi economy. By the late 1950's, an elementary fact was apparent to all who would see: "In the past Iraq was poor because its people could not master their environments. Today (1957) Iraq is poor because it has more money than it can invest".¹

The orientation of the DB can be traced in the four investment programs that it designed, as well as in the various studies that were made by foreign experts who were called in to recommend and help formulate economic priorities and policies.²

Most of the foreign experts agreed that Iraq's investment priority should be the agricultural sector: "Since the fertile land is undoubtedly the most valuable asset in Iraq - even counting oil - it seems to be most appropriate to choose to remain predominantly an agricultural country", wrote Iversen, et. al. The IBRD mission expressed a similar view: "In a country like Iraq, principal emphasis will inevitably need to be placed on the development of agriculture".³

The four investment programs prepared by the DB were merely a "summation of public investment projects with no overall analytical framework". And in spite of the relatively wide authority given to the Board, it limited itself to the role of approving the proposals put forward by the different ministries, obtaining the approval of the Parliament for the expenditure budget and awarding the contracts - usually to foreign companies - for execution.⁴

Much of the blame for the nature and objectives of the economic policies adopted during the 1950's was placed on the DB. The programs made by the DB were labeled by Salter "engineers' planning", since more interest was paid to the technical aspects of the various projects than to their economic implications. Warriner was quite accurate when she noted that it was not the DB who should be blamed, for only "engineers can plan without regard to production and consumption, and this is the only kind of planning that can be undertaken under the present political system and with the existing social structure".⁵

During its lifetime the DB designed four investment programs. The first four-year program, from 1951 to 1955, was replaced by a five-year program

for the period, 1951 - 1956. This was in turn replaced by a third program for the four-year period 1955 - 1959. The fourth program ran concurrently, from 1955 to 1960. Some of the experts (e.g. Salter) recommended that the investment programs intersect in this manner in order that the anticipation of revenues and expenditures could be made more accurately. One reason for the revisions in the programs may have been changes in emphasis and content, but primarily they were due to poor judgement with respect to the size of the oil revenues. The second program, for example, replaced the first just one year after its having been issued. The revenues of the new program were to increase by more than 75%, because of the marked increase in oil revenues after the signing of a profit-sharing agreement with the oil companies. This reason for the revision of the investment plans implied the implicit assumption that shortage of funds is about the only constraint on the size of investment that can be executed internally. This forced tie between the planned investment and the amount of revenues earned from oil export characterized the whole development experience of Iraq, and has led to two inevitable consequences: the continuous interruption and alteration of the plans, since the size of the oil revenues were very unstable, and the accumulation of a huge surplus in the development budget for which no productive outlets could be found.

The planned revenues in the successive programs were based on the anticipated government share of oil revenues. The first program encompassed all the oil revenues from the concessionaires as well as a loan of ID 4 m. from the IBRD. In the second program however, the share of the DB from the oil revenues was reduced to 70%. It can be said that, during the period from 1951 to 1959, oil revenues were about the only source of financing for the development budget.⁶

Irrigation and flood-control received the largest single share of the planned investment in each of the programs. This share dropped, however, from 45% of the total allocation to 30% between the first and the fourth program. Roads, bridges and communications received the second largest share, 24%, remaining nearly constant throughout the programs. Building came after with a share of 20%, followed by industry and housing. This order of priority was only partly interrupted in the second program, when the allocation to industry (electric power stations and installations) preceded that of roads and communications.

The concentration of the DB on irrigation, flood-control, communication and transport projects has been the subject of much controversy among experts.

These projects are by nature huge, expensive and require a long time before they begin to pay off. The basic infrastructure projects were certainly important in the development strategy. But, under the conditions of severe poverty and unemployment and with the housing and migration problems that were evident in Iraq at the time, projects aiming at an immediate improvement in the living standard of the people must have been equally, if not more, important. The problem becomes even more evident if one considers that, because of the gross inequality of the tenure system, the irrigation projects were of benefit primarily to the few landlords.

This trend was modified to a limited extent in the fourth investment program, apparently in response to the Salter and Little reports. Modest as these reports were,⁷ one could not miss the more realistic touch in them. They recommended the execution of projects that would help to increase agricultural productivity, create an industrial base, and give immediate and tangible results in raising the living standard of the people.

Table 4.1 gives a summary of the basic data concerning the performance of the DB. As the rest of the chapter will show, the Iraqi planning activities involved three different types of data: 1) the planned revenue and planned expenditure, which often did not equal each other, 2) the actual revenues allocated for the programs, an amount which was regularly lower than the planned revenue and 3), the actual expenditure which, more often than not, was not only lower than the planned expenditure, but also fell short of the actual revenues.

Table 4.1 The Development Board's Investment Programs. 1951-1959 and 1960, (in millions current ID)

	Planned		Actual					
	Revenue	Expendit.	Revenue	Expenditure				Surplus
				Agricul- ture	Industry	Communi- cation	Build- ing	
1951	10.3	9.3	7.4	1.6	0	0.6	0.9	4.3
1952	20.1	20.5	23.9	3.5	0.1	1.7	2.5	16.1
1953	33.2	28.4	35.2	7.1	0.5	1.9	2.8	22.9
1954	34.3	31.5	40.7	11.6	2.0	4.3	3.0	19.8
1955	41.9	46.6	60.7	11.6	0.4	8.4	11.1	28.7
1956	65.0	81.4	51.1	12.3	5.0	9.2	16.5	8.1
1957	64.9	100.8	35.8	13.2	8.6	12.4	23.2	-21.6
1958	64.9	99.5	61.7	12.6	11.9	7.4	19.9	9.8
1959	65.8	80.0	43.5	10.3	4.8	12.6	22.2	-6.4
1960	65.8	143.0	47.6	10.8	5.7	7.4	23.1	0.1

Jalal (1972), pp 63-67, UN-Supplement (1959) and UN-Studies (1969).

As with the planned expenditure, irrigation projects absorbed the largest share of the actual investment during the period from 1951 to 1959. At an aggregate level, the total actual investment during the period was ID 280 m. No less than 30% of this amount went to the agricultural sector, and to irrigation projects in particular. The shares of communications, housing and industry were 21%, 16% and 12% respectively of the total actual investment. Various construction and administration costs absorbed the rest.

Actual execution on the whole was poor. It was about 55% with respect to the planned expenditure, but rose to 77% with respect to the actual revenue. Revenues and execution in 1957 and 1959 were to a great extent the reason for this relatively high figure. Only in these two years did actual expenditure exceed actual revenues, although the actual expenditures were much less than the planned expenditures. However, in both years the decline in actual revenues rather than any extraordinary increase in investment was the main reason for these high execution ratios.

From the above brief account of the development performance in Iraq during the 1950's, three major comments can be made:

1) The fact that the bulk of the actual investment during the 1951-1959 period was spent on irrigation projects was seen by the new political leadership to be a clear indication of the corrupt economic policy of the old regime. It was seen as a policy which aimed at, as clearly recommended by the experts, "keeping Iraq an agricultural country dependent on the colonial powers". In response to this, among other reasons, the new leaders developed a fascination with the idea of a quick and immediate industrialization of the country. The dilemma that had confronted the pre-1958 rulers and determined their specific economic policy was not analyzed carefully. The execution of these "huge" projects was one way of pumping oil revenues into the economy and making as little an effect on the structure of the society as possible. Their mistake was not that the agricultural sector, in which some 80% of the population was engaged, was given the overall priority. Rather, they failed to carry out the necessary socio-economic measures which would allow the majority of the people to benefit from the development projects.

2) Actual expenditures were, as we have seen, lower than the planned ones, and for many years, even lower than the actual revenues. It may be concluded, therefore, that investment was not jeopardized by a lack of funds. Yet, this might have been too rash a conclusion, for it is difficult to

claim that funds were plentiful in Iraq during the 1950's. It may have been the case that it was the severe defects and shortages in other supporting factors (e.g. appropriate socio-political environment, qualified labor, administrative and planning personnel, etc) which made the availability of funds for this area seem plentiful.

3) The gap between actual revenues and expenditures led to the accumulation of an unspent surplus. The net surplus amounted to ID 82 m. in 1959 (29% of actual revenues). It should be noted, however, that the administrative expenses of the DB are included in its expenditure. Most of the surplus was invested in bonds in Great Britain. Some of it was given in the form of loans or grants to government institutions, a procedure which was used frequently during the 1960's. The accumulation of surplus was another reason for public discontent: "The piling up in foreign banks of one-third of the development revenues became another source of popular dissatisfaction with the government and its development policy".⁸

The post-1958 government, being fully aware of the problem, decided to eliminate the surplus. This was accomplished by simply allocating less oil revenue to the development budget than before. The new share of the budget from oil revenues was reduced from 70% to 50%. The rest of the oil revenues went into the ordinary current budget, where spending was much easier and where the more immediate problems and shortages could be solved or alleviated. This 50/50 division was interpreted as meaning that the government had put equal emphasis on the immediate expansion and the long-run development of the economy. This might have been the case if all of the government revenue was divided equally between the two budgets, if all of the projects financed by the development budget were strictly of a developmental nature, and, more importantly, if the "immediate expansion" was not harmful to the long-run developmental prospects of the country.

The July revolution of 1958 interrupted the implementation of the fourth program. The ministerial committee that replaced the DB decided to carry on with the program, but "at a slower rate". By December 1959, an interim four-year provisional economic plan for 1959 - 1962 was issued. It was interim because the Ministry of Planning intended to work out a more general and comprehensive plan for the period. The provisional plan was in effect for only one year, 1960. Not much time shall be spent here in reviewing this plan since it "did not differ materially from the previous programmes, notwithstanding the change in title".⁹

The provisional economic plan was abandoned in Dec. 1961, after which the Detailed Economic Plan for 1961-1965 was introduced.

4.2 THE DETAILED ECONOMIC PLAN 1961-1965

The most important change in the Iraqi planning machinery after the 1953 revolution was to replace the centralized planning and execution function granted earlier to the DB by centralized planning and decentralized execution. The latter became the responsibility of the concerned ministries.

The Detailed Plan (1961-1965) was issued by the Ministry of Planning late in 1961. The plan was in effect for only one year, 1962. After the political changes in 1963, the plan was suspended and replaced by annual programs. As no alternative to the plan was introduced, we shall proceed by presenting the original one and elaborate on what was actually achieved.

4.2.1 TARGETS AND FRAME

The Detailed Plan, which in fact was far from being "detailed", had the following three targets: 1) to double the national income (NI) of Iraq within ten years, 2) to increase the industrial sector's value added and industrial employment by ID 45 m. and 30,000 job opportunities respectively, and 3) to save as much as ID 43 m. worth of imported industrial goods by producing import substitutions.

To double the NI within ten years, the plan stated, an annual 10% growth rate was required. And with an overall assumed capital coefficient of 3.5, a ratio of 22% of the NI should be invested annually.¹⁰ Naturally the above calculation is incorrect, for the annual investment must amount to 35% of the NI. Apparently, the planners seem to have considered that this 35% investment referred to the NI when the value added of crude oil was excluded, the absolute value of which equalled about 22% of the NI including crude oil. If this were indeed the case, then the planners had implicitly assumed that the foreign oil companies would participate in carrying out the plan's basic goals. This was just about the only prognosis of aggregate variables contained in the Detailed Plan. The capital coefficient of 3.5 was arbitrarily determined and apparently underestimated. The remaining quantified targets were no less arbitrary. To mention but one example, it seems as if the planners thought that, as the industrial value added was to increase by ID 45 m. then the import of industrial goods would drop by a somewhat corresponding amount, i.e. 43 m.

4.2.2 ALLOCATION OF INVESTMENT AND PROJECTS SELECTION

As can be seen in Table 4.2, some 70% of the plan's revenue was due from oil and foreign loans.¹¹ 25% represented a pure deficit. This deficit seems not to have been considered a serious problem for the planners. The plan stated, rather ambiguously, that internal loans may help to fill up the gap. This confidence on the part of the planners may have come from two sources: 1) the past experience of the Development Board during which the actual execution of the planned projects fell short of the planned as well as the actual revenues; 2) the planners' knowledge of the fact that several of the enlisted projects were still in the very early preliminary study stage.

Table 4.2 Planned Source of Revenues and Sectoral Allocation of the Development Plans 1961-1975. (ID in millions.)

	Detailed Plan		Five-year Plan		National Plan		1975	
	ID m.	%	ID m.	%	ID m.	%	ID m.	%
Revenue:	423.79	100.0	561.17	100.0	1727.00	100.0	1076.00	
Oil Revenue	315.8	74.5	390.0	69.5	1554.4	90.0	700.0	65.0
Govern. Establish.	22.8	5.3	12.0	2.1	47.1	2.7	10.7	1.0
Domestic Loans	0	0	30.0	5.3	5.0	0.2	0	0
Foreign Loans	77.2	18.2	95.0	16.9	101.0	5.8	25.0	2.3
Cash Balance	5.0	1.2	30.7	5.5	13.8	0.8	3.6	0.3
Other	3.0	0.7	3.5	0.6	5.6	0.3	336.7	31.3
Allocation:	566.34	100.0	668.06	100.0	1932.03	100.0	1076.00	100.0
Agriculture	113.0	20.0	173.5	25.9	366.2	18.9	207.5	19.3
Industry	166.8	29.4	187.3	28.0	391.0	20.2	448.0	41.6
Transport & Commu.	136.5	24.1	110.1	16.5	219.3	11.3	166.0	15.4
Building & Services	150.0	26.5	134.7	20.2	283.0	14.6	188.0	17.4
Other	0	0	62.5	9.3	672.6	34.8	66.5	6.2
Deficit	142.5		106.9		205.0			
Investment of Self-financed Sector			78.8		321.8			
Investment of Private Sector			181.0		285.0			

Law No. 70 of 1961, No. 87 of 1965. The Provisional Framework (1974) and AAS (1976) + Revenues and allocation of the National Development Plan.
1970 - 1974 refers to that found in the annual investment programs.

Some 30% of the revenues were allocated to the industrial sector, whereas agriculture was only allocated 20%. The remaining 50% were divided somewhat equally between transport and communication on the one hand and building and services on the other. On the sectoral level, the plan claimed to

have allocated 82% of the total investment to the Major Projects, and only 18% to the Complementary Projects (defined as necessary to the profitability of the former). Much of the critical effort was directed towards challenging the planners, not on the utility and meaningfulness of such classifications, but on the accuracy of the ratios.¹²

The Detailed Plan gave three arguments for having allocated the largest portion of investment to the industrial sector: 1) that the capital/output ratios are lower and labor productivity higher in industry than in the other sectors, particularly agriculture; 2) that it is easier to raise the living standard in an industrial society than in an agricultural one; and 3) that a higher growth rate in industry is necessary in order to integrate it with the products of the agricultural sector, so that the latter can be protected from price fluctuations on the world market. As proof of the first point, the plan stated that while capital/output ratios for industrial projects in the plan ranged between 1.18 to 2.87, the ratio was as high as eight in some agricultural projects in "very fertile land". It seems therefore that not only was the total investment level determined on the basis of the overall capital coefficient, but also the sectoral distribution of this investment was governed by the sectoral capital/output ratios. Much valuable literature has been devoted to shedding light on the serious shortcomings of depending heavily on capital/output ratios in planning models. These shortcomings will not be recapitulated here for the obvious reason that the Iraqi planners themselves did not take the capital coefficients into consideration when allocating funds to the other sectors, nor did they appear to have taken seriously the estimates that they did mention.¹³ Needless to say, the above comparison between agricultural and industrial capital/output ratios was not justified, especially since many of the huge agricultural projects represented a sort of social overhead capital, having overall benefits that are generally difficult to evaluate.¹⁴ The reason for giving first priority to the industrial sector must be looked for elsewhere, for example in the reaction to the former economic policy which systematically favored irrigation projects.

Most of the projects included on the agenda of the new plan had already been on the agenda of the Development Board before the revolution. Therefore, in spite of all the criticism against the pre-1958 economic policy, no serious alternative seems to have been offered. On the other hand, it is striking to note that the social implementation of the plan, especially in agriculture, fell short of the declared - and to some extent practiced - attitudes

of the new political leadership. For example, only ID 5 m., or less than 1% of the total plan allocation, went to projects connected with the land reform decree which had been issued a year earlier, and on whose success the whole agricultural sector as well as the transformation of the economy depended.

On the other hand, although the industrial sector was the only one for which the plan provided an estimate for the planned increase in its value added, it is not possible to find any grounds for this estimate. However, some 57% of the total investment in the industrial sector was in projects to be carried out in accordance with the agreements with the USSR and Czechoslovakia. About one-half of the remaining investment was allocated to electrical power stations and installation projects.

As mentioned earlier, about one-half of the total investment was allocated to transport and communication and the building and service sectors. Some 66% of the investment in transport and communication was allocated to only three projects. This reflects what later became a characteristic of the oil countries - prestige projects.¹⁵ Several of the projects listed on the agenda of the plan should have been financed by the ordinary budget, including several of the projects labeled Major and the majority of the so-called Complementary projects, e.g. the government complex, the radio and television building, the purchase of passenger planes, the building of prisons, etc. This was true not only because revenues from these projects to be given to the ordinary current budget, but also because both budgets were by now sharing equivalent amounts of the oil revenues. Finally, once again we can notice the gap between the social content of the plan and the urgent needs of the majority of the population. A few figures will suffice to make the point clear: while ID 10 m. was allocated to Baghdad University, only ID 2.3 m. was allocated for the building of primary schools; and while another ID 10 m. was allocated for the building of 2800 housing units for army officers, only ID 2.1 m. was assigned for rehousing hundreds of thousands of people living in the misery belt around Baghdad.

4.2.3 GROWTH RATES

The analysis of the plan's performance will be based on a criterion which, although generally known for its shortcomings, is commonly in use: the evaluation made with respect to the execution ratio, i.e. the ratio of overall or sectoral expenditure relative to the planned expenditure.

Actual revenue for the plan amounted to ID 280 m., or 83% of the planned revenue. The actual expenditure was at a much lower execution ratio, i.e. only 56% of the planned expenditure. An unspent surplus of ID 34 m. was accumulated, which represented 12% of the actual revenue of the plan.¹⁶

The actual sectoral distribution of expenditure differed greatly from the planned shares. This fact led to a shift in the sectoral planned priorities. The planned priorities were in the following order: industry, transport, building and services and, finally, agriculture. In terms of actual execution, building and services had by far first priority, absorbing about 45% of the actual investment. The remaining sectors, in order of actual execution, were transport, industry and agriculture, the latter receiving only 11% of the actual investment.¹⁷

The first five columns in Table 4.4 (on page 92) contain data concerning the achieved growth rates of the major variables in the economy during the period 1960 to 1964. The first column lists the data for the base year 1960. The second shows the different planned growth rates. Only a very few figures are given here, and some of them were calculated largely by approximation. This will give some idea of the limited scope of the so-called "de-tailed plan".

The planned growth rate in the NI of 7.25% (which the planners had incorrectly placed at 10%) was achieved. This resulted from the relatively high annual growth rate in agriculture, 10%,¹⁸ and an even higher increase in administration and defence, 14% annually.

Two sectors achieved a negative growth rate during the period from 1960 to 1964, namely the construction and the banking sectors. Five sectors achieved a higher growth rate than that of the NI, while industry grew only at a low rate. Crude oil achieved a quite modest growth rate, 5.5%, especially in comparison with its extraordinary increase during the 1950's. The relatively low growth rate of crude oil extraction explains, on the one hand, the narrow gap between the GDP and the NI growth rates, and reveals, on the other hand, that a slight decrease in the dependency of the economy on the oil sector occurred.

The strikingly low annual increase in private consumption, 1.5%, may have been due to its having been deflated with the consumers' price index, which indicated an annual average inflation rate of 3.4% during that period.¹⁹ Public consumption, which had been deflated by the wholesale price index,

increased at a very high rate, 9.3%. This new trend, which became all the more apparent in the oil economies, was a consequence of the government's undertaking of large public works and welfare projects, as well as the substantial increase in employment in the governmental institutions.

With respect to its central target of doubling the NI within ten years, it might be argued that the plan was indeed doing well. What should be born in mind, however, is that this growth target may not have been the maximum possible growth rate that was warranted by Iraq's endowments and resources.²⁰ Furthermore, the relatively high execution ratio of investments may have been due to the drastic shift in sectoral priorities, for most of the investments undertaken were in the service and building sectors, where the projects fell within the capacity of local contractors. In other words, the fact that the economy achieved its overall planned growth rate is not sufficient reason for judging the performance and implementation of the plan as excellent. It is striking that there seems to have been no correlation between the sectoral execution ratios with respect to investment and the achieved sectoral growth rates. This was most obvious in the agricultural sector which absorbed the lowest share of investment yet achieved a relatively high growth rate. This fact suggests that other factors than the mere amount of investment may have accounted for the achievement of the plan's overall growth rate, e.g. favorable weather conditions. The structure of this overall growth was also far from being satisfactory.

4.3 THE FIVE-YEAR ECONOMIC PLAN 1965-1969

This was the first economic plan which was kept in existence throughout its designated period, in spite of the major political changes that took place in 1968. This plan had come into existence just after the 1964 socialistic decrees which placed more emphasis on the public sector and which gave the planners a wider control over the economy.

4.3.1 TARGETS AND AGGREGATE VARIABLES

Law No. 87 of 1965 established the following goals for the five-year plan: 1) to raise appreciably the level of production and the standard of living by accelerating the rate of economic growth and by ensuring a reasonable level of economic stability; 2) to restore equilibrium in Iraq's economy by diversification of production; 3) to reduce the dependency on oil revenues as a source of income and foreign exchange; and 4) to achieve a higher growth rate in the commodity sectors.²¹

The plan proceeded thereafter to determine the anticipated rates of growth at both aggregate and sectoral levels. It was stated that this determination was made in accordance with two factors: the historical rates achieved in the previous ten-year period, 1953 to 1963, and the impact of the new efforts made to improve performance.

The overall planned growth rate of the NI was put at 8% per annum (6% for the crude oil sector and 8.6% for the non-oil sectors). Combined with a capital coefficient of 3.6, this required an investment of 31% of the non-oil value added, or ID 820 m. Of this amount, ID 560 m. was to be financed by the central government, ID 80 m. by municipal and self-financed sectors, and ID 181 m. by the private sector excluding oil companies.²²

The determination of the sectoral growth rates was carried out in two different ways. For the commodity sectors, the rates were selected so as to allow them a higher than average growth rate and, at the same time, in order to cope with the already determined growth rate of the NI. As for the remaining sectors, their anticipated growth rates were determined by multiplying the overall planned growth rate by the respective sectoral income elasticities, based on the data from the ten-year period 1953 to 1963.²³ The average growth rate for the commodity sectors was thus determined at 8.1% per annum (9.4% excluding crude oil), 7.4% for the distribution sectors and 8.3% for the service sectors.

After having determined the sectoral growth rates (see Table 4.3), the sectoral capital/output ratios were selected in order to allocate investment among the various sectors. Once again, capital coefficients were apparently subject to iterative adjustment so as to fit the overall assumed coefficient.

Although the data seem to have been consistent up to this point, for some reason the plan increased its allocation over the warranted ones, as well as over the revenues by ID 107 m., as can be seen in the Table below and Table 4.2 (on page 82).²⁴

For the first time in Iraq, the five-year plan also provided planning targets for employment and for the share of foreign currency needed. The plan had estimated employment in the base year, 1964, to be 2,119 thousands, and attempted to increase it by about 2.4% per annum. This seems consistent with the hypothetical rate of increase of the population of 2% anticipated by the plan.²⁵ The estimated increase in employment on the sectoral level was concluded from summing up the employment opportunities expected to be

created by the projects listed in the plan. It is important to note, however, that the plan failed to point out any wage targets, and therefore, missed an important device for carrying out its non-quantified goal of narrowing the gap between the social classes. The planned increase in value added and in employment suggested that the incremental value added/employment ratio was expected to be about ID 1067 (crude oil value added included).

Table 4.3 Basic Data for the Five-Year Economic Plan, 1965 to 1969 (ID, m.)

	Planned Increase in Value Added	Capital/ Output Ratio	Total Alloca- tion	Allocation of Central Government	Revised Allocation in Central Government
Agriculture	48	3.3	158.0	142.0	173.0
Industry & Electr.	59	3.6	215.3	157.0	187.3
Transport & Commu.	20	5.9	119.0	91.0	110.1
Construction & Serv.			263.0	108.0	134.7
Trade			3.8	0	0
Defence	101	3.3	25.0	25.0	25.0
Foreign Obligation			2.5	2.5	2.5
Follow-up			35.0	35.0	35.0
NI (excl. oil)	228	3.6	820.0	561.0	668.1
Crude Oil	51				
NI	280				

Law No. 87 of 1965.

The foreign exchange required was estimated on the basis of certain fixed ratios of the planned sectoral investment. No well-defined method can be found in the plan for determining the share of foreign currency in sectoral investment. Actually, as more than 86% of the plan's revenues was to come from oil revenues and foreign loans, foreign currency would seem to have been a far less important constraint on investment than other factors such as technical and feasibility studies of projects and skilled labor. What made this calculation even less important was the fact that no attempt to plan for the external trade variables was made. Other quantitative targets of the plan can be found in column six and eight of Table 4.4 (see page 92).

4.3.2 PROJECTS SELECTION

The agricultural projects were divided by the planners into two groups: irrigation and drainage, and land reform and productivity projects. The first group of projects was intended to contribute a growth rate of 4.5% to the total growth rate of 7.5% that had been planned for the agricultural sector. According to the plan, this 4.5% rate amounted to an ID 31.5 m. increase in the agricultural value added by the terminal year. Combined with a capital/output ratio of 5, investment in these water projects should have amounted to ID 157 m. Now in order to keep the total investment and increase in the

value added consistent in the sector as a whole, the capital coefficient in the second type of project should be as low as 0.06, as an investment of ID one m. in them would increase the agriculture value added by ID 16.5 m. Only on the basis of such a calculation could the plan be said to have been formally consistent with the figures it had introduced. Yet it seems very doubtful whether Iraq had had the capacity and ability to carry out a program of reorganization, a general agricultural policy and environment improvement so as to increase the value added by ID 16.5 m., with so small an investment as one million ID.²⁶

However, the plan showed far more interest than all the previous ones in small-scale agricultural projects aimed at improving institutional organizations, productivity, marketing, mechanization, financial facilities, agricultural cooperatives and storage installations. As much as one-fourth of the revised investment in agriculture was allocated to these much needed and long ignored aspects of the economy.

It does not seem as if any criteria were used for selecting the agricultural projects. Actually, many of the irrigation and drainage projects listed in the plan could be found in the previous plan, which in turn had inherited them from the Development Board. Mahdi found that for these projects, which were comparable in the present plan and the previous one, the estimated cost was increased on the average by a little less than 50%.²⁷

As stated earlier, the total nominal allocation to industry amounted to ID 215m., of which only 5 m. was to come from the private sector. The allocation of the industrial investment among the various projects was based on a criterion which aimed at harmonizing the sub-sectoral industrial values added of Iraq with the "normal" ones as introduced in the UN (1963) industrial survey study.

The UN study divided the manufacturing sector into 13 sub-sectors. Based on data for 53 countries in 1953 and 42 countries in 1958, a set of standard equations was derived with per-capita income and size of population as exogenous variables. Given these two variables, the equation will solve for the normal size of the industrial sector. Also, "given an independent projection of total manufacturing output, it is easy to compute the corresponding normal levels of sector outputs, thus providing a set of benchmarks of sectoral planning".²⁸ On such a basis, the Iraqi planners found that while the values added of only four sub-sectors deviated positively from the

"normal" standard, nine sub-sectors deviated negatively. Therefore, they distributed the planned increase in the value added of industry among the various sub-sectors in such a way so as to keep the deviation constant in the absolute value between the base and the terminal year. This implied, of course, a reduction in the percentage deviations in the terminal year.

Contrary to the claims of the plan, the actual selection of projects seems to have had no relation to the above described novelty, if only because of the fact that "the industrial projects included in the 1965-1969 plan were almost the same industrial projects as those in the previous plan".²⁹ And as we have hinted at earlier, the previous plan had taken most of these projects directly from the Little report of 1956. On several occasions some alterations in capacities, kinds of inputs and location of the projects were registered. And in most of the cases, a high increase in their estimated costs was made.³⁰

The failure to use the UN criteria is not, however, a cause for regret, since such criteria do not take into account the particular endowment of resources of each country. A distance should be maintained between the development of branches where the economy has certain advantages and the trap of becoming a one-sided economy. The UN criteria may have some value in comparative studies and in giving some idea about the general weight of various sectors, but certainly not in providing a basis for the sectoral allocation of investment.

The plan also claimed that, in some instances, priority criteria had been used in selecting some of the projects. These were net capital/output, capital/foreign exchange and capital/labor. These ratios were provided for 17 industrial projects. How the planners could have made use of these three ratios together for the selection of projects without at the same time giving each of them special weight, remains to be explained. It is simply just not possible.

4.3.3 IMPLEMENTATION

In practice, the five-year economic plan stood on two feet: the 8% planned annual growth rate in the NI and the 2% growth rate of the population. The first target was, in turn, largely dependent on the planned growth rate of agriculture and crude oil (35% of the planned increase in the value added), both of which were greatly beyond the control of the planners. The second

assumption concerning the population growth proved - not surprisingly - to have been highly unrealistic.

In comparison with the central government planned development revenue of ID 561 m., the actual revenue amounted to ID 402 m., i.e. about 72%. The ratio of actual to planned expenditure was far lower, a mere 55%. Again, an unspent surplus of ID 37 m. accumulated, representing 10% of the actual revenues. The share of oil revenues in financing the actual plan rose from a planned 70% to an actual 93%. The investment execution ratios on the sectoral levels varied considerably, ranging from as low as 44% in agriculture to as high as 700% in trade and banking. Consequently, a shift in investment priority took place, as 45% of investment went to building and construction against a planned 35%, and 12% to agriculture against a planned 21%.³¹

The share of the government in financing the net domestic saving dropped from 32% in 1964 to 27% in 1969. The public sector's share in the gross domestic capital formation averaged 57.5% during the plan. Although this represented an increase compared to the 50% share during 1957-1963, it fell quite short of the plan's target of 78%.³² The failure of the plan in fulfilling its remaining targets, i.e. income and employment, is not less evident, as can be seen in Table 4.4

Compared with the 8% annual growth rate in the NI that was planned, a growth rate of only 5.5% had been achieved. Only four of the 11 sectors grew at a higher rate than the planned rates: administration and defence, banking, trade and construction.

The failure of the plan in carrying out its targets of "structural readjustment" can be seen by looking at the composition of the GDP in the base and terminal years. The share of the commodity sectors in financing the GDP declined by about 1%, whereas the service sectors gained more ground. The share of crude oil also decreased, by some 2.6%, as did the share of agriculture. Still, the plan could claim some, if slight, success in decreasing the dependency on oil revenues. The share of crude oil in the total visible export declined by less than 1%, and in the total foreign exchange earning by about 2% between 1964 and 1969.³³ Its failure to bring about the general structural readjustment remains, however, clearly evident.

The shortcoming of the plan in fulfilling its income targets, combined with what appeared to be a very great underestimation of the population growth,

were reflected in the goal of raising the standard of living. The per capita income increased by 2.2%, compared with the 6% that was planned.

Table 4.4 Planned and Actual Growth Rates for the Period 1960 - 1969, in the 1964 Constant Price

	A 1960 ID m.	Growth r.		1964		Growth r.		1969	
		P %	A %	P ID m.	A ID m.	P %	A %	P ID m.	A ID m.
Agriculture	100.9		10.1		148.1	7.5	4.8	212.6	186.9
Mining & Quarrying	216.4	9.5	5.5	511.1	268.8	6.0	3.5	359.7	319.8
Industry	56.2	9.2	3.0	92.2	63.4	12.0	7.0	111.7	89.1
Electr. & Water	3.7		20.0		7.7	20.0	17.3	19.2	17.1
Construction	23.8		-5.5		18.7	8.0	10.3	27.5	30.5
Transport & Commu.	41.0		7.5		54.9	6.0	3.0	73.5	63.8
Trade	33.5		7.5		44.5	5.7	6.3	58.7	60.6
Banking	9.0		-3.6		7.7	10.0	14.8	12.4	15.3
Dwellings	12.3		5.0		14.8	2.5	1.2	16.7	15.7
Services	39.3		7.0		51.4	8.3	3.1	76.5	60.0
Admin. & Defence	47.2		14.5		81.2	8.0	8.3	119.3	121.3
Total GDP	538.6		6.9		761.2	7.7	5.2	1103.4	980.1
NI	451.1	7.2	7.2	595.7	595.8	8.0	5.5	875.4	780.0
Private Consump.	330.5		1.5		350.4	5.5	5.2	457.9	451.9
Public Consump.	119.0		9.3		169.5	8.0	7.9	249.0	248.4
Population (m.)	6.885		3.1		7.846	2.0	3.3	8.662	9.205
Employment (th.)	2082	0.3	0.5	2106	2119	2.4	3.2	2380.7	2546
Income per cap. ID	65.5		3.8		76.0	5.9	2.2	101.1	84.7

Law No. 70 of 1961, Law No. 87 of 1965 and The Provisional Framework 1974.

The 1960 data are deflated with a unified GDP deflator.

Private and public consumption are deflated by consumer price and wholesale price indices respectively. The planned growth rates refer to the sectoral value added in the NI.

P = planned; A = actual.

With regard to employment, it may be said that the plan enjoyed a "glorious" success. The success was only superficial, however, as the following will show. Based on actual investment during the plan and the implicit ratio, employment should have increased by some 200,000. In fact, the actual increase was more than twice that figure, 427,000. However, with an increase in the labor force of 3.6%, the actual increase in employment seems thus to have absorbed the newcomers to the labor market, but failed to employ those who were already unemployed.

In short, three alarming trends had been reinforced by the end of this plan.

1) Although the actual revenue in the central government sector fell short of the planned revenue, actual expenditure was at an even lower level. Thus about 10% of the actual revenue remained as a surplus. The situation was made worse by the shift that occurred from the planned sectoral investment

toward the service sector.

2) The agricultural sector had absorbed more than 61% of those newly employed during the plan span. Employment in agriculture had thus increased by some 22%. Keeping in mind that its share in the national income had dropped by some 1% during the same period, the already alarming discrepancy between the share of agriculture in the national income and in the total employment had deteriorated further, reaching by 1969 24% and 54% respectively. The service sectors absorbed about 18% of the increase in employment during the plan. During the first three years of the plan, the number of government employees increased from 160,000 to 187,000, i.e. at an annual average rate of 5.7%. At the same time the number of employees in semi-official institutions increased by an average of 3.4%.⁴⁰ If we extend these ratios to 1969, it appears that about 17% of the increase in employment had been absorbed by government and semi-official institutions. By 1969 the salaries in public administration amounted to 13% of the NI and absorbed 40% of the then current budget expenditure.³⁵

3) Total consumption was increasing at a rate of 6.4% per annum, quite a bit higher than that of the NI. Public consumption played a decisive role here, for it was increasing at an annual rate of almost 8%. Under natural conditions, this should have represented a constraint on the amount of saving the society was able to provide. In the oil countries however, the amount of capital formation that can be undertaken is confined by other factors than the availability of funds. The negative consequence of this state of affairs will be dealt with later in the study (cf. chapter 8). It is sufficient to state here that the society was enjoying an increase in consumption which was not warranted by a similar increase in the value added, even including crude oil value added.³⁶

As was the case with the previous plan, the dependency of the economy on the crude oil sector had dropped slightly, but this was due more to the relatively low growth rate of crude oil production and export rather than to any spectacular growth in the rest of the economy. In other words, this slight decline was in no way a consequence of any well-founded policy and practice to over-compensate for the decreased dependency on the crude oil.

The 1964-1969 plan was an "impressive document". Without doubt it was wider in scope than any other previous plan. However, it was far from being a "comprehensive plan", if only because it lacked a combined set of monetary,

fiscal and taxation policies as well as a plan for foreign trade. The plan tried to use sophisticated planning techniques, but could not follow through because of its lack of an overall picture of the strategy of development in the country, as well as its lack of basic data and knowledge about the economy.

The official evaluation as stated in the Provisional Framework of the following plan was that it "had made quite a big push", while other evaluators declared that the plan was a poor example of budgeting and had an even poorer performance. The truth lies, perhaps, somewhere in between the two statements. In any case, however poor the plan was, its implementation was worse. And in this respect, it was the politicians who bore the largest share of responsibility. The political unrest in the country, including internal war, the absence of clear strategic long-term planning and the tendency towards gaining immediate popularity by introducing premature measures that harmed the long perspective of the economy were some of the important causes of the poor achievements of the plan.

4.4 THE NATIONAL DEVELOPMENT PLAN

It is not possible to treat this plan in the same way as the two previous ones. This is because the original form of the plan (Law No. 70 of 1970) was subject to at least two drastic changes, both of which concerned the planned revenue and investment allocation of the central government sector.³⁷ The difficulty arose from the fact that no adjustment whatsoever had been made in the various quantified targets of the plan to match the successive increases in revenues and allocations. Thus, since 1971, the year of the first amendment, the plan ceased to exist in practice. What remained was a set of projects to be executed within a certain time period at a certain estimated cost. However, the plan in its original form will be presented briefly here, along with a review of its amendments before trying to adjust the sectoral planned value added with the final form of planned investment.

4.4.1 THE ORIGINAL PLAN ³⁸

The targets of the plan were divided between economic and social ones. The former included raising the per capita income at the rate put by the UN for the Second Decade of Development, doubling the NI within ten years, putting more stress on the commodity sectors, and achieving a better regional balanced growth and a better integration with other Arab economies. The

latter targets included a widening the social services and "establishing the basis of the socialist system", by increasing employment opportunities, coordinating wage levels and relating them to productivity.

The planned variables were determined in the following order: increase of income per-capita, NI growth rate and sectoral value added increase, needed investment defined by its origin and type of currency and divided up according to sector as well as to kind. The determination of production targets was followed by employment and wage targets, consumption and savings and finally, foreign trade targets.

To achieve a per capita annual growth of 3.7 assuming an annual population increase of 3.3%, a 7.1 % annual growth in the NI was needed. The planned sectoral growth rates were determined in such a way so as to ensure this growth rate in the NI.³⁹ The needed aggregate and sectoral investments were determined on the basis of the planned increase in aggregate and sectoral values added and the assumed aggregate and sectoral incremental capital/output ratios. The amount determined was ID 1072 m., 43% of which was to come from the central government, 30% from the self-financed sectors and the remaining 27% from the private sector. Although the allocations of the central government budget gave first investment priority to agriculture, followed by industry and services, the allocation of the total development budget followed the norm of the previous plans, giving as much as 37% of the investment to industry, 20% to agriculture, 15% to dwellings and 14% to transport and communications.

Based on the previously defined income targets and the 1969 technical sectoral coefficients relating income to production⁴⁰, the production targets for the terminal year 1974 were defined on the sectoral and aggregate levels. Total production was to increase by 40% during the five years, ranging from as high as a 145% increase in the production of mining other than oil, and as little as 7% for crude oil production.

The planners proceeded thereafter to determine employment and wage targets. The annual increase of employment was put at 4.4% (compared with a 3.6 increase in the labor force). The new employment opportunities were divided up on a sectoral basis, in which agriculture, once again, was to absorb more than one-half of the planned increase. As in the previous plan, the incremental sectoral value added/employment ratios were extremely high compared with the average sectoral ratios for 1969 (a 45% increase on the aggregate level).

Wage per worker (excluding agriculture) was to increase by 1.4% per annum, whereas the share of wages (excluding agriculture) in the NI was planned to drop slightly during the period from 1969 to 1974. However, as much as one-quarter of the increase in the GDP during the plan was to be absorbed by wages.

The remaining set of targets put forward by the plan can be seen in table 4.5.

Table 4.5 Resources and Expenditure of GDP in the NDP for 1969 to 1974.
(ID in millions)

	ID m.			Annual Growth
	A 1969	P 1974	P Increase	
Resources				
1. NDP (f.c.)	986.2	1332.8	346.6	6.2
2. Depreciation	52.7	71.9	19.2	6.5
3. Net Ind. taxes	82.4	104.7	22.3	5.0
- GDP (m.p.)	1121.3	1509.4	388.1	6.1
Expenditure	1121.3	1509.4	388.1	6.1
1. Private Consumption	511.6	684.0	172.4	6.0
2. Public Consumption	251.6	321.1	69.5	5.1
3. GDC Formation	159.0	301.8	142.8	13.6
a- Net Saving	147.8	264.2	116.4	12.3
Business	65.5	103.6	38.1	9.5
Household	41.8	68.1	26.3	10.2
Government	40.5	92.5	52.0	20.6
b- Depreciation	52.7	71.9	19.2	6.5
c- Current Account	-41.5	-34.3	-7.2	-3.5
4. Export	407.5	465.5	58.0	2.7
5. Import	-208.4	-263.0	54.6	6.1

Booklets of the NDP (1970).

A = actual; P = planned.

Some of these variables had been determined in accordance with those already fixed, while others had their own norms.⁴¹

The selection process for the projects in the plan will not be elaborated upon here. Basically, all that has been said concerning this issue in the previous plan would seem to apply here as well. The majority of the projects listed in this plan had also been listed in the previous one, either because these projects had not been carried out as yet, or because work was still in progress on them. For example, in the irrigation and drainage sector, which absorbed 42% of the allocation in agriculture, the number of projects on which investments had not already been spent was six of a total of 31. The same was true concerning the chemical projects, as all four projects mentioned (17% of the total allocation in industry) had already been started during the previous plans. Apparently no project selection criteria had been used, or at least did not differ from those that had been claimed in the previous plans.⁴² What is worse, as much as 16% of investment from the

central government was allocated to projects for which, apparently, no completed preliminary studies had been made. Since as much as 68% of the investment of the budget went to projects which were already under construction, only 16% of the funds was actually allocated to new, somewhat defined, projects. The anticipated total cost of the projects rose tremendously in this plan, compared with the previous ones. For example, the total estimated cost for 22 irrigation and drainage projects was put at about ID 200 m. in the 1960-1964 plan, but estimated to be 360 m. in this plan. The same was true in the industrial sector, where the total cost for 12 projects was put at ID 82 m. in the first plan but raised to ID 111 m. in the second and 133 m. in this plan. But up to the year 1969, only ID 60 m. had actually been spent on these projects.

4.4.2 AMENDMENTS OF THE PLAN

As indicated above, the first amendment to the plan (Law No. 158 of 1971) was made following the agreement with the oil companies. The allocation of investment by the government budget was increased by 64% at a time when planned revenues increased by 77% (revenues from oil increased by 95% and from foreign loans by 15%). Such a huge increase naturally requires a change not only in the planned investment of self-financed and private sectors, but also in all quantified targets of the original plan. Neither of these had been carried out. The amendment did re-allocate investment among four sub-sectors, and named the projects to be executed. For example, since the allocation to the industrial sector increased by 57%, this was absorbed by stating a number of new projects and anticipating their cost, and by raising the allocation to the projects mentioned above. (The ratio of planned allocation to total anticipated cost of these projects rose slightly from 50 to 52%.) On the other hand, the funds allocated to non-specified projects rose tremendously in absolute value but remained constant as to percentage. However, the amendment could claim the "honor" of allocating - for the first time in Iraqi planning history - some 2% of the planned industrial investment for the working capital.⁴³

As the anticipation of the oil revenues proved to be anything but accurate, the annual investment programs were deviating more and more from the plan. The plan - or rather what was left of it - had fallen in the same trap it tried to avoid when it abstained from allocating expenditure on a year-to-year basis. In one financial year, 1972 - 1973, there were as many as five different budgets for revenues and allocations.⁴⁴

By the end of 1973, with the vast increase in the oil revenues, allocations for 1974 were more than six times higher than what had been anticipated. Only about one-half of this amount was actually spent.⁴⁵

Based on the assumptions of the plan, the following Table is an attempt to calculate what the sectoral value added should have been, knowing the actual allocation of investment that was made in the annual programs. Also, the target of the original plan and the actual achievements for the years 1974 and 1975 are given in the Table.

Table 4.6 Planned and Actual Targets of the National Development Plan in 1969 Constant Price

	A 1969 ID m.	Growth Rates			1974			g.r. A %	A 1975 ID m.
		P %1	P %2	A %	P ID1 m.	P ID2 m.	A ID m.		
Agriculture	191.0	6.9	12.1	-3.0	266.7	338.0	166.0	1.5	163.5
Mining & Quarrying	343.2	1.8		5.3	375.2		443.4	16.2	515.4
Industry	103.0	10.5		8.3	169.0		153.7	18.6	182.4
Electr. & Water	16.8	11.4	16.0	2.0	28.8	252.0	18.6	25.8	23.4
Construction	38.5	15.0	20.0	6.5	77.4	95.5	52.7	31.3	69.2
Transport & Commu.	69.1	7.7	14.0	6.4	100.1	131.8	93.5	31.4	122.9
Trade	90.1	8.5		7.7	135.5		130.7	4.9	137.2
Banking	15.5	9.6		17.2	24.5		34.2	24.6	42.6
Dwellings	44.7	3.5	9.0	8.0	53.1	538.0	65.4	4.7	68.5
Services	80.0	7.6		9.5	115.4		125.4	11.2	139.4
Admin. & Defence	117.8	5.5		12.8	154.0		215.5	43.9	310.1
GDP (excl. oil)	766.5	8.0	12.0	6.6	1123.9	1354.5	1055.7	19.3	1259.1
GDP	1109.7	6.2		6.2	1499.1		1499.1	18.4	1774.5
NI	885.1	7.1		8.7	1247.2		1344.5	24.7	1676.2
Private consump.	571.0	6.0		7.5	684.6		818.0	-8.1	751.7
Public consump.	242.5	5.0		23.6	337.2		698.0	-26.0	516.7
Population (m.)	9.130	3.3		3.3	10.737		10.765	3.3	11.124
Employment (th.)	2546.2	4.4			3165.7				
Income per cap. ID	96.7	3.7		5.2	116.1		124.9	20.6	150.7

AAS (1974), AAS (1976), Booklets of NDP and Oil & Development magazine, July 1969.

A actual, in 1969 constant prices

P₁ planned as in the original form. P₂ = Planned as constructed on the basis of the actual allocation in the annual investment programs.

As can be seen in this exercise, the actual growth rate of the GDP (excluding oil) during the plan was not only about one-half of what it ought to have been (according to the tolerant margins in the calculations above). It is even lower than what was anticipated in the original form of the plan. When oil is included, the real actual growth rate matches the one that had originally been planned. The high rate of increase in the NI during the plan was greatly due to the nationalization of foreign oil companies.

Comparisons between achieved and planned targets seem out of place for this plan, not only because the plan ceased to exist in practice, but also because the great increase in oil revenues, due to nationalization and price rises, changed drastically the whole setting of the aggregate variables in the economy.⁴⁶

CONCLUDING REMARKS

In the early 1970's, Jalal wrote: "For Iraq, however, what matters most is not the approach to planning, but the political commitment to feasible projects and determined action towards their implementation".⁴⁷ A few years later Al-Sa'dy pointed out that he was "convinced by now that planning methods had been defended and given more importance than they deserved in the process of economic development. The writer found that the social, economic and political present setting of the country (Iraq) does not allow for absorbing and developing these methods and techniques".⁴⁸

These two points of view are in general correct. However, one cannot treat the two problems that are indicated here separately from each other. The selection of feasible projects is to some extent a consequence of the planning approach adopted, and a better planning method will help to improve the setting of the economy and allow it to utilize further advanced planning techniques.

As we have seen in the analysis above, the planners' expertise was growing. And although each plan was wider in scope than the previous one, in essence the planning technique remained heavily dependent on somewhat arbitrary assumed aggregate and sectoral capital coefficients. Also, as two sectors provided for more than half of the GDP, the whole fate of the plan, however broad it may have been, was dependent on a few highly sensitive ratios. The plans were still constructed on the basis of iterative adjustments and the attempt to utilize some partially advanced criteria seems to require a highly pragmatic treatment. However, in spite of what can be said about the planners' approach and occasional errors, the essential problems remained in connection with implementation. The poor execution ratios and the reasons behind them seem not to have been thoroughly investigated. It was probably understood as being due to an accidental event rather than being a reflection of an existing set of interrelated socio-political and cultural constraints along with an inadequate supply of local resources. It is not surprising therefore, that while the plans were failing to invest the revenues

that they were receiving, successive increases in the planned revenues and expenditures were being made.

The planned sectoral investment priorities, which since 1960 had placed industry at the top of the list, almost always shifted its focus in actual execution giving actual priority to various service activities, followed by transport and communication. This was due, basically, to the fact that these projects were either small and within the capacity of local contractors, or if undertaken by foreign contractors, did not require extensive, highly specialized follow-up maintenance.

Naturally it is true that some of the reasons behind the low execution ratios and the reappearance of the same projects on the agendas of successive plans were found in the insufficient coordination between the executive agencies, the general inefficiency of the bureaucracy, the poor quality of preliminary and feasibility studies and the shortage of reliable statistics. But as long as no well-founded solutions could be provided for these problems, it is doubtful whether the allocation of more funds to the plans would have improved the situation.

The commitment of the political leadership to development cannot be adequately measured in the oil countries by the size of revenues allocated to development. This commitment must imply the ability and the willingness to undertake a set of perhaps unpopular policies in the short-run for the sake of the vital goals in the long-run. These include the confinement of the rentier type of expansion which is easily attainable by the oil countries and which gives a false impression of prosperity. Further reference to these points will be made in chapter 8 in this study. The commitment should imply nevertheless, that the political leaders would produce as clear a picture as possible of the sort of long-term economic setting that they are striving for, in order that short- and medium-run plans could be evaluated accordingly. In the absence of any long-term planning, it is difficult to see how successive plans will be related and how future bottlenecks can be anticipated and adequately resolved.

Our review of the planning experience in Iraq indicates that the planners and/or the politicians saw the amount of money available for the plan as being about the only constraint on the size of the investment that can be made. The direct link between oil revenues and planned investment was, and still is, a binding institutional barrier to the development efforts. And it still

hasn't been realized that an increase in oil revenue does not, by itself, indicate that the ability of the economy to absorb productive investment has increased correspondingly. In the absence of any real oil production strategy, allocation to the development plans was fluctuating with the exported oil volume, with oil prices and with the state of affairs between the government and the concessionaire. Regardless of its success, the country is therefore, still trying to invest as much funds as it can get rather than trying to mobilize as much resources as the plans require, and as the country can absorb. That is mainly why development planning in Iraq was, and still is, "wasteful in terms of resources and time, as well as expectation".⁴⁹

It is on the basis of this conclusion that our study will proceed: first, to try to single-out the factors that seem to play an essential role in determining Iraq's ability to absorb productive investment and second, to elaborate upon the oil production strategy that the country should adopt. Our proposition implies in fact, as will be demonstrated later, that Iraq should adopt an oil production program based on the needs of its economic plans, rather than vice versa.

NOTES

1. Warriner (195/), p 121.
2. The reports of the foreign experts called in directly or indirectly by the Iraqi government include: IBRD (1952), Iversen et al (1954), Salter (1955) and Little (1956).
3. Iversen et al (1954), p 147 and IBRD (1952), p 97.
4. UN (Studies - 1969), p 5 and Warriner (195/), p 127.
5. Warriner (1957), p 131.
6. The loan by the IBRD appeared in the first two programs. In the third and fourth programs, interest on the accumulated surplus was introduced as a source of revenue, contributing little more than 1% of the total revenues of the fourth program. See Laws 35 of 1951, 25 of 1952, 43 of 1955 and 54 of 1956.
7. Salter and Little reports adopted a static-comparative cost criterion to advocate paying marginal attention to industrialization: Production and trade should be determined by applying a comparison criterion between opportunity cost of producing an object internally and the cost of importing it. In equilibrium, therefore, Iraq should produce only those goods whose production costs are lower than their import prices. Any protection tariff will reflect negatively on the urban-rural income distribution and on efficiency. Iraq was an excellent country for which such a policy could be recommended, as no serious im-

diat balance of payment problems were to be expected. Cf Al-Nasrawi (1967), pp 45-50, where an analysis of the shortcomings of these ideas is presented.

8. Badri (1972), p 294.
9. UN Studies (1969), p 5. For the year 1960, 38% of the expenditure was to be in public buildings and housing, 13% in agriculture and 10% in industry.
10. Law No. 70 of 1961. To double the national income within 10 years requires an annual growth rate of 7.2 rather than a simple average rate of 10%. Assuming a capital coefficient of 3.5, investment should amount to 25% of the annual national income.
11. Some 14% of the planned revenues was to be financed by foreign loans. These consisted of loans from the USSR and Czechoslovakia. The former was a part of the Iraq-USSR economic agreement of April 1959, amounting to 550 m. rubles and comprising 13 industrial projects. The loan bore an interest rate of 2.5% to be repaid seven years after the newly established firms started production.
12. Hasan (1966), p 252, stated that only 50% of the total investment went to the productive investment. Mahdi (1977), p 111, on the other hand, found that some 25% of the allocation for the complementary projects in the productive sectors belonged to "non-productive" projects. However, as long as no clear and sound criterion for this separation is given, it is difficult to make any judgement.
13. See for example Reddaway (1962), pp 206-212 and Streeten (1972), chpt. 6. It is of interest to note that as total planned investment in industry was put at ID 166.8 m. while the planned increase in the industry's value added was put at ID 43 m., the implicit marginal capital/output ratio thus amounted to 3.8. This sectoral ratio is higher than the one considered by the planners for the economy as a whole.
14. Cf Jalal (1972), p 50.
15. As usual, since the time of the pyramids, prestige projects serve political aims. If Iraq is to have the largest airport in the Middle East, she should - as she indeed did - allocate ID 11 m. for it. This is a small sum, however, compared to the ID 23 m. allocated for the construction of a government complex, or for the sum allocated for the Republican hospital, where the cost per bed was ID 10,800. Neither did the plan neglect the arts, for ID 1 m. was allocated for building an opera house at a time when few people in Iraq had any knowledge of opera at all, not to mention the fact that few even had any adequate housing.
16. The planned data are modified to account for four rather than five years. See Tables 3.3 and 4.2.
17. UN Studies (1969), p 8. Jalal (1972), p 67 and Maarouf (1977), p 303.
18. The value added of agriculture in 1960 was 12% lower than its level in 1957. Therefore, the average annual increase of agriculture between 1957 and 1964 was only 4.7%, measured in current prices.
19. UN Supplement (1962), p 183 and UN Studies (1967), p 82.

20. The doubling of the national income within 10 years was an aim copied from the economic plan of the UAR (Egypt and Syria), Iraq's rival at the time. See Hasan (1966), p 252. On the other hand, the fact that while actual investment was about 56% of the planned investment, whereas the planned and actual national income growth rates coincided, may tell us something about the accuracy of the planning itself.
21. Law No. 87, 1956. Other targets included reaching a more balanced level of income distribution both among social classes and geographical areas, and a greater level of economic integration with the rest of the Arab economies.
22. The plan failed to indicate the criterion according to which the share of the private sector in the plan was determined. It was thought that it was calculated as the residual between needed investment and revenues from other sources. The planned increase in the value added of crude oil was put at ID 51 m. No mention of the necessary investment for this increase is made in the plan's document.
23. The construction sector was the only exception. The plan assumed that its share of investment would remain constant, and therefore assigned to it an 8% growth rate. Dr. Mahdi argued that a growth rate of 15%, similar to that of the capital formation, should have been the target. Mahdi (1977), p 134.
24. This was due mainly to the fact that the plan had listed a number of projects which were still in the preliminary study stage. And since the planners were sure that only a few of these projects would be executed but were unable of selecting which ones, they left the matter unsolved.
25. Actually this imposed rate is unjustified, as it had amounted in the few years prior to this time to as high as 3.1% per annum. At the same time, the labor force was increasing at 3.6%. It could be said, therefore, that as unemployment amounted to some 121 thousands in 1964, the planners had "planned" to increase it by about 24% a year. The Provisional Framework (1970), p 48.
26. This calculation depends naturally on the agriculture value added in the base year. If this value added was ID 110 m., as is mentioned in several references, then the 4.5% annual growth rate which is due to come from the irrigation projects would result in an increase of ID 27 m. after five years, rather than 31.5 m. as was stated in the plan. With a capital coefficient of 5, this would require an investment of ID 135.5 m. rather than ID 157 m. The projects in the second group which would be responsible for a 3.5% growth rate, would have a capital coefficient of 1.1. However, it is rather controversial to separate the effects of these two types of projects and assign to each of them a certain amount of planned increase in value added.
27. Mahdi (1977), p 144.
28. UN (1963), p 32.
29. Jalal (1972), p 56.
30. Mahdi (1977) found that an increase of 39% of the anticipated costs of these industrial projects was made, on the average, between this plan and the previous one.

31. Tables 3.3 and 4.2; Maarouf (1977), p 303 and the Provisional Framework (1970), p 139 and 144.
32. Although the net domestic saving had increased at a rate of 4.2% per annum during the plan, its ratio to the national income had fallen from 20.2 to 17.9 between 1964 and 1969. But as the current account surplus increased from ID 14.5 m. to 41.5 m. between these two years, investment fell shorter than saving. Compared with a planned investment-ratio to the national income of 22%, actual investment did not exceed 15.7% (excluding the oil sector). The Provisional Framework (1970), pp 112-113.
33. Ibid.
34. The Provisional Framework (1970), p 50. The official unemployment amounted to 5.4% in 1964, but dropped by 1% in 1969.
35. Ibid., pp 160-161.
36. In current prices, private consumption was increasing at an annual rate of 7.8%, and public consumption at 8.2%. The share of total consumption in the total available resources (i.e. GDP plus import) rose from 52% to 57% between 1964 and 1969. This was partially balanced by a decline in the gross domestic capital formation from 15% to 12%.
37. The first amendment was issued in 1971 (Law No. 153). The second amendment referred to the extraordinary increase in planned investment for the year 1974, the final year of the plan.
38. NDP - Booklet (1970).
39. Mining and quarrying was split into two sub-sectors: crude oil, which was given a growth rate of 1.4%, and the remaining, with a growth rate of 19.2%. The crude oil sub-sector had been treated ambiguously in the plan. Some references claimed that the value added of the non-national crude extraction should remain constant during the plan. This conclusion was drawn from the fact that the share of oil revenues in the plan was to remain constant throughout the whole period. However, the plan document stated that "some of the increase in the GDP in the mining sector is to come from non-national investment". Still, this "non-national" investment was never mentioned explicitly.
40. The plan stated that these coefficients were adjusted by three factors: the increase in production value resulting from the execution of previous and current plans' projects, the expected increase in productivity and the expected increase in the utilization of capacities.
41. E.g., public consumption should grow at a lower rate than the private consumption, the growth of private consumption should not exceed that of the NI. Surplus in the balance of trade was to remain almost intact between 1969 and 1974, at some ID 200 m.
42. Although the plan indicated in general when some of the projects were to be initiated and when completed, no corresponding distribution of expenditure over time was made. Actually, the plan had had no annual budgets for expenditure similar to those of revenues. Furthermore, while the type of project to be executed in agriculture, industry and transport sectors were started, only the execution authorities for

projects in the rest of the sectors were mentioned.

43. NDP- Booklets(1970) and Law No. 153 (1971).
44. The five versions of the budgets followed closely the changes in the anticipation of oil revenues. The planned revenues in each of the five versions - with the exception of the fourth - were higher than in the previous one. However, actual revenue in that year was some 13% lower than that which had been anticipated in the original form of the plan.
45. The Planning Ministry (1975), p 56.
46. An investment program for the nine-month period from April to Dec. 1975 was made. The planned revenues and allocation, actual investment and the effects on the economic setting can be seen in Tables 4.2, 3.3 and 4.6 respectively. The policy of changing the revenues allocated to the plan in accordance with expected changes in oil revenues also appeared in the 1976-1980 development plan. The plan initially called for ID 5 b. worth of investment. A year later this figure was doubled. Total planned revenues in the annual programs of the plan amounted, however, to more than ID 15 b. This last figure is the primary one. Further increases in the planned revenue were expected. See The AAS (1979), Al-Thawra, Jan. 10, 1978, Nov. 11 and 14, 1979; and The Official Gazette, Jan. 14, 1980.
47. Jalal (1972), p 44.
48. Al Sâdy (1974), p 8.
49. Sayigh (1978a), pp 71-72.

5 THE ABSORPTIVE CAPACITY AND DEVELOPMENT DETERMINANTS

INTRODUCTION

Are the oil-exporting countries suitable objects of study for the field of development economics? One might think not if underdevelopment is defined in terms of such indices as per-capita national income, or if one ignores the difference between investment funds and capital formation, i.e. the transformation of non-consumed funds into capital stock. However, when other more essential characteristics are taken into consideration - such as the disintegrated internal economic structure, the severe discrepancy between the sectoral distribution of the labor force and the values added, low productivity, extensive illiteracy, an uneven income distribution, the lack of a basic infrastructure and the inadequacy of the socio-political setting - then the oil-exporting countries are indisputably a part of the underdeveloped world.

This does not mean, however, that the oil-rich countries face the same conditions as the rest of the underdeveloped world in tackling their economic problems. At present, thanks to their highly valued oil export, the oil countries are better off than the other underdeveloped countries with respect to the availability of funds. The urgent questions that arise here then are not how to provide the funds for financing investment in the country, but rather how much funds the economy is capable of transforming into capital formation and what are the factors that determine such a process; in other words, the absorptive capacity of the economy and its determinants.

These two questions are the topic of the present chapter. Our previous investigation of Iraq's economic setting and development experience will be our guide here. The concept of absorptive capacity, as advocated in the chapter, will provide a basis for the latter part of the study. As will be clearer later on, our central proposition for determining the oil extraction program in connection with the internal investment planning depends largely on the observation that for any given time there exists a limit beyond which an economy cannot absorb further productive investment.

5.1 THE CONCEPT OF ABSORPTIVE CAPACITY

Few terms have been so frequently cited in economic literature yet so poorly understood as that of "absorptive capacity". As Eckaus (1972) noted, the concept remains something of a "black box", often used as a residual explainer. The reasons for this may be fairly easy to trace. While the absorptive capacity concept refers apparently to the qualitative and quantitative limits that ought to bound the size of local investment, development economics considered the scarcity of capital to be the basic factor here, both as a cause of and a result of underdevelopment. It is therefore not surprising that the term has been derived within the context of foreign aid extended to the underdeveloped countries from the developed ones.¹ It was argued in the early studies that foreign aid ought to be guided by the state of the balance of payments in the aid-receiving countries. The purpose of the aid was to attain that balance. Absorptive capacity is defined along these lines even in some more recent studies, as the total value of imports relative to the country's total export, or total foreign exchange earning.²

In the more elaborated studies, absorptive capacity is understood to be related to the ability to use capital productively. It is also recognized that this ability is dynamic rather than static. However, the economists are in disagreement as to how the limits on this ability are expressed.

A familiar explanation of the limits on the size of local investment that can be carried out productively can be found in the traditional technological hypothesis of diminishing return to scale. Adler (1965) found the absorptive capacity concept to be meaningful only when it is related to the rate of return on capital which the economy considers to be acceptable. Absorptive capacity is thus defined as "the amount of investment, or that rate of gross domestic investment expressed as a proportion of GNP, that can be made at an acceptable rate of return with the supply of cooperating factors considered as given".³

Defined in such terms, the limits on absorptive capacity become general rather than particular to the underdeveloped economies. Adler concluded, however, that the functional relation that exists between the investment and the expected rate of return is steeper in the underdeveloped economies than in the developed ones. This difference can be assigned to the inelasticity of the supply of the production factors that are complementary to the capital in the underdeveloped economy. Furthermore, for various reasons the acceptable rate of return on investment is higher in the underdeveloped economies than

in the developed ones, which implies further restrictions on the size of the investment warranted in the underdeveloped countries. Since absorptive capacity was identified in relation to the particular state of complementary production factors, short, medium and long-run absorptive capacities ought then to be distinguished in a similar manner as that concerning various price elasticities of supply. The causal inverse relation between investment and return is not the same, therefore, throughout the time period.

Consequently, the factors which determine absorptive capacity are much the same as those which affect the rate of return. Adler grouped these determinants under five headings: lack of knowledge, skills, and management experience, institutional limitations and cultural and social constraints.⁴ This interpretation of absorptive capacity, being quite familiar to economists, was adopted implicitly or explicitly in a number of studies. The difficulty of defining a "minimal acceptable rate of return" for each and every investor, especially when foreign investors and investment opportunity abroad were taken into account, was recognized but has not as yet been satisfactorily resolved. The minimum rate of return was introduced by Adler on the basis of two observations he made: 1) that absorptive capacity is a meaningful concept only if it is related to the rate of return on capital and 2) that the use of the marginal efficiency of capital as a measurement tool of this capacity will imply the existence of an absolute limit beyond which the marginal efficiency becomes zero or negative. Adler considered this to be a "conceivable but unlikely event". He introduced, therefore, the minimal acceptable rate of return in order to avoid having the return fall to the zero absolute bound. The marginal efficiency of capital becomes somewhat qualified in this manner, for the analysis in effect draws a line and suggests that investors will not go beyond it, even for a positive return.⁵

Eckaus (1972) introduced a different interpretation of absorptive capacity, based on extending the principle of the gestation period for new investments. This period comprises a specific time horizon for every new investment project in order to allow for the adaptation and learning processes to work themselves out, in addition to the usual gestation period allowed for the project to achieve its full capacity. Eckaus called the adaptation and learning phase of the gestation period, the "maturation period". The length of the maturation period and the gap between the productivities of the new investment at the start and at the end of that period are an increasing function of the size of the new investment.⁶

In a somewhat earlier treatment than that of Adler, Horvat (1964) considered absorptive capacity within the context of defining the optimum rate of investment in an economy. Horvat was interested in finding the physical limit on the productive investment in the society, and to that end, the resulting effect of investment on the productive capacity, i.e. the growth rate of the economy was considered, rather than the rate of return.⁷ Horvat started by defining the gross social product and classifying the various types of investment. He considered the sole goal of a society to be the maximization of its consumption or of its output. This maximization involves defining the best allocation of the factors of production as well as the adjustment of their various rates of future expansion. The absorptive capacity of an economy is thus defined as "the potential effects of the optimum adjustment of the growth rates of factors". The economy is considered as being girted by a particular productive capacity that is able to expand at a maximum (or lower than maximum) rate. Any increase in investment beyond that point will result in a reduction of, or at least no increase in, output.⁸

To illustrate the concept, Horvat made use of the investment-production function, i.e. the change in the production coefficient as a function of investment, the production coefficient being the amount of increase in output which results from a unit increase in investment. In the context of the investment-production function, the optimal investment level is defined as the maximum level of investment that can be productively applied, i.e. the level at which the elasticity of the production coefficient will be equal to a unit. Below that optimal investment level, an underplanned solution will exist. In this case, the "capitalist case" as Horvat called it, the production coefficient will be high. Consumption will also be high because investment is less than "optimal". The growth rate of output will be low however, because not all the investment opportunities are exploited. If investment were higher than the optimal level, an overplanned solution would exist - the "USSR case" according to Horvat. Here, the production coefficient and consumption are lower, while the output growth rate is higher than in the underplanned solution. In the optimal solution, the production coefficient will have an intermediate value. And although the investment level will be intermediary here, this would result in the highest output growth rate.

The example above is simplified somewhat, but illustrates nevertheless the basic idea: when investment is pushed beyond a certain level, its external dis-economies outweigh its positive contribution in as far as the output growth is concerned. But how does the absorptive capacity concept arise?

Horvat meant that the investment-production function depended on four factors: capital stock, absorptive capacity, their rates of expansion through time. Absorptive capacity, in its turn, was a function of five variables: personal consumption, health status, level of knowledge, economic and political organization, and finally, a factor representing "all other relevant characteristics of the economy". Similarly, the absorptive capacity's expansion rate was seen as a function of the growth rates of the above five variables.

The first four of these variables are policy variables, the fifth is taken as exogenous. Furthermore, the economic and political institutional setting of the economy is assumed to be a datum.⁹ Absorptive capacity is thus limited, because there are given levels and limited potential speeds of change of the people's will to work, their state of health, skills, and the institutional structure of the society. Nevertheless, although changeable, it is a datum that is measurable and can be approximated.

At any time, the relation between investment and output is determined by the capital stock and the absorptive capacity of a specific country. For any given investment-production function, it is possible to determine a certain level of optimal size of investment. This in turn will correspond to a certain amount of output increment. In such manner the absorptive capacity of an economy represents the general ability of the society to manipulate the stream of output increments. The absorptive capacity imposes a certain limit beyond which further investment does not pay. Whether output will increase at a slower pace, stagnate or even decline for any additional investments is still in fact an open question. For our purposes here, it is sufficient to stress that the size of investment that an economy can or should undertake at any specific time is limited and that this limit has its origin in economic as well as sociological, political and institutional factors.

It is important to note that absorptive capacity and investment or capital stock are clearly interrelated. For, while the former imposes a limit on the latter, the latter helps, in most instances, to expand the former. This is true, not only for the absolute level of the investment and capital formation in the country, but more importantly for the particular investment policies adopted by the country concerned. It is obvious that a particular investment strategy more than another can help to remove some of the bottlenecks of the absorptive capacity and allow for further investment.

It may be recalled in this context that the absorptive capacity concept was a corner stone in Hirschman's celebrated doctrine of Unbalanced Growth. The major reason for advocating the unbalanced investment strategy is not, as is frequently claimed, the shortage of capital. Rather it concerns the rationalization of investment decisions and the "ability to invest" principle. The ability to invest is in turn a function of the amount of investment that has already been made. It "is acquired and increased primarily by practice, and the amount of practice depends in fact on the size of the modern sector of the economy".¹² Hirschman made no attempt to provide a measure for this ability, although his estimate of the forward and backward linkages could provide some indirect estimates. He defined underdeveloped countries as being "weak in interdependence and linkage" and explicitly excluded the investment in some activities as being able to open the horizon for further investment possibilities: "The output of mines, oil wells and plantations can slip out of a country without leaving much trace in the rest of the economy."¹³ It may be concluded, therefore, that even if further investment were to depend on the size of the investment already undertaken, investment in the crude oil enclave could well be excluded.

After this review of various contributors, our own view on the issue follows here, and can be summarized in the following points.

1) It seems that absorptive capacity is defined somewhat similarly in a number of studies. The capacity put a certain limit on the amount of productive investment that could be undertaken at a specific time in a specific economy. In particular, absorptive capacity reflects the ability of an economy to manipulate the stream of output increments. It is also generally recognized that there exists a functional relation between absorptive capacity and investment, and that along with the usual economic factors, this ability is much affected by institutional, cultural and socio-political constraints. The specific determinants which seem to have limited the ability of the Iraqi economy to absorb productive investment will be elaborated upon later in this chapter. But as mentioned previously, the absorptive capacity of an economy has been defined in some studies only with reference to the state of the balance of payments. This seems to us to be a far too narrow way of viewing the concept. We will return to this point in chapter 7 of the present study.

2) While economists seem to be in agreement as to the basic variables to which absorptive capacity refer, they disagree as to the way this absorptive

capacity makes itself felt in the economy and in the way it can be measured. The use of marginal return as a measurement for absorptive capacity is primarily based on considering the supply of production factors that are complementary to capital in the productive process as being inelastic in the long-run. In the short-run, furthermore, the increase in the supply of these complementary factors is either impossible physically or requires an extraordinary cost. As more doses of capital are applied while other factors are kept constant, the rate of return will decline. Whether or not this rate will become zero or negative is still a disputed question among economists. What is important here is the necessity of assuming that all the socio-political and cultural factors in a society are measurable and can be included in the production function. This is a common problem, however, whether the resulting effect of new investment on return or on the output is considered, i.e. whether the Adler or the Horvat approach is considered. The more absorptive capacity is seen as being related to these immeasurable sociological factors, the more vague becomes the absorptive capacity measures.

There are a number of technical and conceptual difficulties that undermine the use of marginal return as a true measurement of absorptive capacity. Very rigid conditions are required in fact in order to reach a state where the rate of return to the investor represents the true benefit for the economy as a whole. The types of prices used, the existence of appropriate conditions and responsiveness in the market and the existence of a firm causal relation between capital and return are but a few of the complicated questions involved.

3) The methodology advocated by Horvat seems more appropriate for our purposes. This is not only because Iraq's development planning has depended - as we have seen earlier in the study - to a great extent on the capital coefficient rather than on capital return, but also because the various plans were unable to invest all the funds allocated to them. Our interest here lies in providing a theoretical background for establishing a certain upper limit on investment, an aspect that is basic to the model to be presented in a later chapter.

This postulation is sometimes applied in growth and planning models, although its origin is not often explicitly clarified.¹⁴ Thus, given the historical performance of the economy, as well as the expected shortages of some of the production factors and the degree of severity of the institutional and socio-political constraints, then an exogeneously postulated maximum possible

rate of growth of the gross investment and/or the GDP will be introduced. Presented in such manner, absorptive capacity becomes an increasing function of the general growth rate. This view of the concept draws on Hirschman's "ability to invest" principle, an ability that is acquired and increased by practice. Investment in the crude oil enclave seems, however, to lack such merit. Investment there, though necessary in order to provide the country with funds, seems to play only a marginal role in improving the general ability of the country to absorb further investment.

The question as to whether investment beyond the postulated bound will bring about positive or negative increases in output should not disturb us here.¹⁵ For our purposes, it is the basic concept that is important, namely that there exists an upper bound beyond which the Iraqi economy was unable to invest further at any specific time. We introduce the concept in its simplest form here in order to apply it empirically later on in the study.

5.2 THE DEVELOPMENT DETERMINANTS

Once we attempt to single out the factors that seem to have played an essential role in determining Iraq's absorptive capacity and pace of development, the analysis cannot escape relying on the so-called socio-economic approach. It was demonstrated earlier that the dilemma concerning absorptive capacity is that while the concept is substantially dependent on non-measurable social and institutional factors, it is more convenient for the analysis if some quantitative index can be applied.

It is probably true that "every formalization must run the risk of oversimplification, in particular in purely quantitative models, yet without formalization and abstraction no theory is possible".¹⁶ However, it is difficult to understand why a necessity was converted into a virtue by many economists. "The introduction of mathematical formula into economic theory has produced among economists a tendency towards splendid isolation, based on the belief that their discipline dealt with autonomous and measurable variables."¹⁷ Economics was becoming more and more sophisticated, but also less convincing in its interpretations of the very complex phenomena of underdevelopment and growth. It is obvious that as long as economic institutions cannot be isolated from other social institutions, it is impossible to separate their working mechanisms and evolution from other social considerations. A meaningful inquiry into the economic institutions as part of a larger social structure must take into account the decisive interrelations of

these institutions with the other parts of the social organization.¹⁸

The current challenges that the oil-exporting countries are facing provide the occasion for reaffirming the trivial procedure of defining development or underdevelopment in terms of a single quantitative index. The state of affairs in these countries gives support to the suggestion that funds may not be as important a factor for development as is often been taken for granted in the literature. The availability of funds is, of course, a necessary condition for undertaking investment. But once these funds become available, other very serious factors will hinder the ability to execute investment. Not all of these factors may be found within a strict economic realism.

Historically the availability of funds for investment purposes was provided by the accumulation of surplus resulting from the productive process itself. The size of the accumulation and the general ability to invest grew at a somewhat comparable pace. The substantial difference between saving, or the share of the resources that is not consumed, and capital formation was absent. The state of affairs in the oil-rich underdeveloped countries is characterized by the fact that their wealth is not generated by the actual productive effort. This should reinstate the important distinction between saving and investment. The search for the determinants that hinder the smooth transition between these two stages must take into account which factors underlie the global shift in the society and the economy alike.

The socio-economic approach, therefore, takes on numerous issues. At the very general level, it asks why development of some kind took place in one part of the world while it failed to do so in another.¹⁹ At a specific level, it asks what are the most significant factors that promote or hinder the development process in particular areas at specific times. The treatment is necessarily of a historical nature and requires a deep investigation into social, cultural and political bases in addition to the economic one.

It should be pointed out, however, that just as the "quantitative approach" has its disadvantages, so does the socio-economic alternative. The spectrum of value judgements is not smaller here. It is perhaps even larger. Furthermore, causality relations are vague and difficult to determine with any accuracy. The socio-economic approach can suggest, often in very general terms, causes and effects but is hardly able to provide rigorous "proofs" for its suggestions. Some see this, however, as being the prime merit of this approach. The approach provides general outlines and principles

within which each particular case for a specific time period can be fitted on its own merits.

In a study having great insight, Mahdavy (1970) searched for the reasons why the Iranian economy had grown only modestly during the period from 1954 to 1965, in spite of the relative abundancy of funds. He traced the long-term impact of the sectoral distribution of output and labor force, of the pattern of consumption and of investment. Thereafter, the major economic variables of Iran were compared with those of 24 other countries having a similar per-capita income. He concluded that if the performance of the other rentier countries was similar to that of Iran during the period, then one could doubt "whether the availability of capital and foreign exchange are as crucial as they are sometimes assumed in the process of economic development".²⁰

Mahdavy singled out two reasons that explain this "very normal growth rate":

- 1) the quality and type of the socio-political organization. The presence of this factor reveals the fact that the substitution degree between organizational and financial resources must be quite low, and that abundant financial resources cannot be fully utilized unless the socio-political barriers are removed. Mahdavy therefore declared: "Political change may thus turn out to be the factor with the highest shadow price in rentier states".
- 2) The solution of the organizational political problems is a necessary, but certainly not a sufficient condition for the acceleration of growth. Mahdavy pointed out that one must look for other hindrances. These can be found in the structural defects created by the inflow of rent, and by the type and consequences of the economic policies of governments.

A number of outstanding econometric studies have been carried out in order to determine empirically which factors play a decisive role in promoting development. Adelman and Morris (1968a) classified 73 underdeveloped countries into three groups with respect to real growth in the GNP during the period from 1950 to 1963. In the second stage of the study, they considered 29 indicators of various aspects of economic, social and political characteristics, combining both "statistical and judgemental elements".²¹ Finally, discriminant analysis was applied so as to select those characteristics that added most to the explanation of the variance in growth among the three groups. Only four variables were selected as being capable of explaining as much as 97% of the variation: the degree of improvement in the financial institution (i.e. the flow of domestic saving), modernization of outlook, extent of

leadership commitment to development and the rate of improvement in the physical overhead capital.

When the countries were reclassified in accordance with these four variables and a new discriminant function was constructed to explain the mean variations among the new groups that were formed, another set of highly significant variables was selected. The first three were the same as above, but the rate of improvement in agricultural productivity replaced that of overhead capital.²²

In a later study, Adelman and Morris (1968b) proceeded by deducing a regression equation for each of the four most significant variables as well as additional equations for the selected variables appearing in these regression equations. A model containing 14 equations and 19 variables of which five were exogenous was thus found. The quantitative importance of each variable was deduced by calculating its direct and indirect impact on the original discriminatory function. They concluded: "It may not come as a surprise to development specialists that when the multipliers calculated from the model are ranked in order of importance, the majority of the ones above the medium are non-economic in nature".²³

Based on the view of Adelman and Morris, among others, Sayigh (1978b) attempted to single out the determinants of the Arab economic development. His work was based on his thorough investigation into their economies in his earlier studies (i.e. 1978a), and on "his intimate knowledge of the 12 countries... in addition to 350 interviews which he personally conducted and the literature he examined to enable him to pass judgement... on the state of operation of various determinants".²⁴

Sayigh started by giving a quite firm definition of development: it implies quantitative and qualitative improvement in the technical, political and socio-cultural institutions. Before growth becomes the outcome of the performance of the society itself so that the whole economy moves towards an improved level of action and productivity, satisfactory development could not be said to have taken place. A further six conditions were advanced, e.g. an innovative socio-political environment, a more equitable income distribution, self-reliance, wider participation of the masses, etc. The advantages of this definition lie in the fact that it incorporates several factors and requires various conditions in relation to each other, before passing judgement on the performance of an economy.

Sayigh's development determinants were a modified version of those of Adelman and Morris which better fitted the specifications of the Arab economies. The determinants were divided into three groups: nine economic determinants, six political and administrative determinants and five socio-cultural determinants.²⁵ The study then tested a hypothesis suggested by a number of researchers, stating that at the lower development level, the socio-cultural determinants are the most relevant. Only when these determinants are satisfied, i.e. unfolding a higher development status, do the political determinants begin to be noticeably operative. The purely economic determinants work at an even higher level.

One of Sayigh's major conclusions was: "...the impact of economic, political administrative and socio-cultural clusters is felt more at one phase or state of development than another. However, the range of influence is not open-ended"²⁶. This, of course does not imply that any one cluster can be dispensed with for a period of time while others exert their influence, for "all clusters operate all the time". It merely suggests that various sub-groups of determinants do not have equivalent significance at various development stages.

The above presentation illustrates even further the practical and conceptual problems that accompany the use of the determinants concept. On the one hand, it is almost impossible to give even a rough estimation of the quantitative importance of various determinants at various times. On the other hand, it is just as difficult to establish a formal cause-effect relationship among the determinants themselves or between the determinants and development. In particular, it is difficult to decide whether it is development that brings the determinants into operation, or vice versa. In reality, these relations are reciprocal and any suggestion regarding causality relations must be a simplification.

With these various studies as our frame of reference, as well as our earlier presentation of Iraq's economic setting and development performance, we shall proceed with our attempt to single out some of the factors that seem to have played a basic role in determining the pace of development in the Iraqi economy.

After almost half a century during which the country has had a relative abundance of funds, it seems fair to state that the performance of the Iraqi economy has hardly been impressive. This is true of the economy in general, but also in particular if one examines the performance of the manu-

facturing and agricultural sectors where most of the emphasis had been concentrated. It is interesting to note also that the progress of the Iraqi economy is unimpressive when compared with a number of other non-oil underdeveloped economies.²⁷ The Iraqi economy has remained basically an agrarian one, with respect to the engagement of its population, but an oil-based economy with respect to the financing of the NI. The economy is large living and exclusively expanding on a financial base that had originally been earned without any real expenditure of productive effort.

As yet, no promising response has been seen in any major sector of the economy. On the contrary, several alarming tendencies are becoming increasingly evident and persistent. The dependency on oil revenues in financing the NI and the foreign exchange earning is increasing. The expansion of the tertiary sectors and the slacking off of the agricultural sector are nearly getting out of control. The tremendous increase in imports due in part to shortages in local supply; the increasing tendency to engage foreign contractors to deliver turn-key projects as a means of getting around the country's inefficiency and shortages, including the problems of poor maintenance capability and lack of qualified personnel; the presence of strong inflationary pressure caused by the heavy demand on limited resources, by the exposed nature of the local economy towards the international markets and by the "generous" expenditure policies adopted by the government have all led to a great misallocation of resources. It is obvious that the availability of more funds will hardly help Iraq to solve these problems. In fact, some of these problems have arisen just because funds were so abundant.

Three basic factors will be singled out here as being directly responsible for the very moderate performance of the Iraqi economy. This does not mean, however, that other determinants and bottlenecks mentioned earlier are irrelevant. Rather, the development determinants include a large number of interrelated factors that operate in an extremely complicated fashion. The following three determinants are perhaps the more obvious and effective and consequently receive more attention here: 1) the quality of human resources, 2) the type and degree of commitment of the leadership to development and 3) the political stability of the country.

It has been demonstrated above when dealing with Iraq's economic setting and development experience that the major bottleneck is the human factor in the productive process. There is a grave lack of qualified and efficient per-

sonnel on all levels of production and administration, from the preliminary feasibility studies down to the maintenance services. This inefficiency is partly the result of the general passiveness arising after many years of disappointment, harassment and a generally discouraging environment. It is also the result of the poor quality of the educational institutions and of inherited socio-cultural norms as well as the "imported ones". The new consumption patterns and prestige values seem to have accelerated the degree of frustration and corruption of the less fortunate groups in the society. Further discussion of these aspects, also in connection with the role played by the rentier nature of the economy, will be presented in the last chapter of the study.

When the first serious efforts towards development were made in Iraq in the early 1950's, it was decided that a certain fixed portion of the oil revenues were to be allocated to the development budget. This procedure was enforced by government decrees which first allocated the entire revenue to development, then reduced that portion to 70% and finally to 50%. On the surface it would appear that the political leadership in Iraq was committing itself by these fixed ratios to development. But unless this approach is supplemented by some form of control over the total amount of oil revenue received, or of the oil output produced, it is difficult to see wherein lies the advantages. If the government decides to invest a certain fixed portion of the oil revenues received without having any idea of how much these revenues are going to be, then this will function more as a severe institutional constraint on investment planning rather than as a promoter of development efforts. The arbitrary nature of this procedure becomes obvious once it is recognized that the increase (or decrease) in the crude oil output or in oil prices does not, ceteris paribus, necessarily provide evidence that the economy is capable of absorbing a similar proportional increase in investment, (or should suffer a similar decrease .)

In an economy such as that of Iraq, it is important to stress structural changes, perhaps more than quantitative expansion. Structural change implies, on the one hand, the need to lessen the degree of dependency on the oil sector, and on the other hand, the need to pay serious attention to the bottlenecks which hinder the response of the other sectors rather than merely allocating them more funds. Both of these cannot be achieved, however, without the existence of long-term planning which clearly states what type of economy the leadership is aiming at, with which means they intend to realize it with so precise a time schedule as possible. Furthermore, the lea-

dership should make explicit how its various economic measures and short-run plans relate to its long-term goals.

The commitment of the political leadership to development cannot be measured by the size of the development budgets alone. This is particularly true in the case of the oil countries where capital is perhaps the easiest factor to provide. The conversion of a presently rich but unproductive economy into a self-sustained, productive and truly healthy one requires the will and the ability to control the spontaneous rentier expansion of the economy²⁸ and to avoid the false ambition of immediate prosperity and flagrant consumption. These are difficult tasks which cannot be accomplished without the genuine participation and support of the people, nor without a certain degree of political stability, continuity and tolerance.

Every writer who has treated Iraq's economy has noted the extremely negative consequences of the country's political instability. Sayigh stated: "Perhaps here, more than anywhere else, lies the key to understanding Iraq's contrasts between rich endowment and poor performance: the key is the political management of the economy which, through discontinuity and frequent violent changes, has inhibited growth and confused decision-making in the public sector and the private sector alike".²⁹ Hardly anything more need be said in order to stress the importance of this factor in the development of Iraq's economy.

The three basic determinants discussed above are interrelated. The political management of the country has had serious consequences for the enthusiasm of the people, the initiative and qualifications of the public servants; it has indirectly led to the immigration of many qualified and educated people, perhaps for other reasons than the lack of suitable employment opportunities. The quality of the labor resources, the commitment to development and the political management of the economy all refer basically to the human factor in the development process. This is not surprising if one realizes that human capital, although the end of all development efforts, is also its basic means.

CONCLUDING REMARKS

In the literature of development economics, it is almost always assumed that developing countries have large populations and a small amount of funds. This description does not fit the oil economies, where the population is often small in relation to the amount of funds available for the countries' development.

Some leading development economists have maintained that e.g. "Kuwait and perhaps Iraq have nothing to worry about",³⁰ since they are exporters of a much desired raw material which brings in a substantial amount of revenue. Through the workings of the usual price mechanisms, it was thought that the investment and productivity levels prevailing in the crude oil enclave would be extended to other sectors of the economy. Underdevelopment was generally understood as being the shortage of funds to finance the investments. Only a few economists argued that underdevelopment also mean the inability to execute the investments even when the necessary funds to finance them are available.

It is in this context that the importance of the absorptive capacity concept can be understood. It reinserts into the discussion an awareness of the problems connected with the very complicated process of transforming non-consumed funds into capital formation. It allows an analysis of the factors that hinder and impose limits on this process. Absorptive capacity has been defined in somewhat similar manner in a number of various studies. Generally the concept refers to the ability of the economy to undertake productive investment. It is also generally recognized that this ability is closely related to and dependent upon sociological and political factors as well as the economic ones.

Disagreement among the economists arises, however, when the question of measuring this ability is discussed and whether or not the absorptive capacity bound imposes an absolute limit on investment. The use of the marginal productivity of capital as a measure of absorptive capacity involves a number of practical and conceptional difficulties. There is also a tendency to dismiss the effects of sociological factors on absorptive capacity once a quantitative index of the return on capital is the center of attention. The measurement adopted in the present study is the direct effect of investment in increasing output. Absorptive capacity is thus defined as the ability of the economy to manipulate the stream of output increments. The type of planning techniques adopted in Iraq give further support to this choice of definition. The concept is reduced here to its simplest form in order that it may be used in our illustrative model outlined later in the study (see chapter 7).

Understood in this context, absorptive capacity becomes to a certain extent development and growth capacity. In an attempt to define the determinants of this capacity, the analysis relies on the so-called "socio-economic

approach". Although superior to the purely "quantitative approach", it does not provide rigorous proofs of causality or of the weights for the various determinants. On the basis of the various studies of development determinants as well as our previous review of Iraq's economic setting and development planning experience, three basic factors that seem to have played a direct role in determining the country's economic performance were identified: the quality of the human resources, the commitment of the leadership to development and the political management of the economy.

One of the main conclusions we have reached concerns the procedure adopted by the Iraqi governments whereby a certain fixed share of oil revenue is allocated to the development budget. We have argued in this chapter that without knowing in advance how much oil revenue the country can expect to receive, this procedure, rather than facilitate development, will in fact become a constraint of an obviously arbitrary nature. Without knowing how much oil the country will extract and export (at a given price), the decision to allocate a fixed share of the oil revenue to investment inverses the whole logic of planning. It indicates that the policy-makers see the availability of funds as being the only constraint on investment. But how much oil should a country extract from under the ground, and can economic theory provide a conclusive answer to this question? To this and other related issues the following chapter is devoted.

NOTES

1. See the classic article of Rosenstein - Rodan (1961).
2. Cf Jefferson (1976), pp 136-148.
3. Adler (1965), p 35 and 5.
4. Ibid, pp 131-134.
5. Adler himself has noted, however, that the "minimum acceptable return" is a loose concept, and it would be difficult to define a rate that would be the least acceptable to every investor, especially when foreign investors and investment opportunity abroad are taken into account.
6. Eckaus (1972), pp 87-89. Adler's article provided a basis for the discussion of various issues related to the absorptive capacity concept, including the gestation period and the state of the balance of payments.
7. In Adler's treatment, the rate of return does not only reflect the allocation state of capital, but is also an adequate measure "or proof of

the rationality of the allocation of all resources". P 22. Adler noted however, that such an argument requires rather strict conditions, e.g. that market prices will represent the true equilibrium prices.

8. Horvat (1964), pp 177-179.
9. Ibid., p 182.
10. I.e. investment must keep expanding until its relative change will at least bring about an equivalent relative increase in the capital co-efficient.
11. Horvat's analysis proceeded as follows: Underdeveloped economies can, therefore, be defined as ones in which "the share of investment is less than optimum and/or the level of the absorptive capacity factors is low": As development proceeds, the absorptive capacity will expand to such an extent that some of the factors on which it previously depended will start to diminish, until finally they disappear from the function. These factors will be "no longer productive agents, but only ends in themselves". Absorptive capacity will then be reduced to a question of level of knowledge, "which remains the only limitational factor of growth". Horvat suggested calling it "the intellectual capacity of a community". It is this capacity which will put the economy on the road to the "golden age".
12. Hirschman (1958), p 38.
13. Ibid. See also Higgins (1968), p 340.
The linkage concept seems somewhat ambiguous. Theoretically it refers to the possibility of providing local inputs for a particular industry or the use of the output of this industry as an input for other industries. Empirically the degrees of linkage are approximated using the Keynesian multiplier and accelerator effects. But in any particular investment project, the latter will depend more on the size of the new revenue earned from this industry and the type of investment policy which this revenue finances.
This type of ambiguity was obvious in the simplified model constructed by Metwally & Tamaschke (1980). The model attempted to test the hypothesis of export as an engine to growth, or as a leading sector thesis, in three Middle Eastern oil producing and exporting countries. They took into consideration the indirect contribution by the oil sector in the economic growth (growth in GDP) of the country via the medium of spread or carry-over effects which encompass Hirschman's type of linkages. The model suggests no strong evidence of spread effect from oil export on the rest of the economy in general, nor on the growth of real sectoral output in particular. On the other hand, the internal investment in these three countries responds significantly to the increase in oil export. These two results are not contradictory. All that they do tell us is that oil export generates the revenues which are used for capital formation in these oil countries, and that these investments, for some reason, are not leading to a symmetric increase in the GDP. The results of the model say more about the state of these oil economies and the type of investment policies adopted, than about linkages.
14. See our critique of Motamen's model in chapter 7.
15. Chenery & MacEwan (1966) used in their model such an absolute bound on investment: "There is substantial evidence of a limit to the ability

of developing countries to transform large increases in external resources into productive investment. The most convenient measure of this absorptive capacity limit is the rate of increase in investment which a country can achieve on a sustained basis". P 151. They did speak however, of the possibility of allowing the investment to exceed the postulated limit, but only at a higher capital/output ratio and with a longer time lag. P 159. Millikan, in his short commentary on the model, supported this possibility, for he maintained that "...absorptive capacity is not that sharply bounded. The model would gain greatly in realism if k , the capital output ratio, could be made an explicit increasing function of the rate of investment". P 179.

16. Hershlag (1970), p 375.
17. Andreski (1968), pp 16-17.
18. Fusfeld (1977), p 775.
19. A number of studies have been carried out in order to provide an answer to this question in relation to the Middle East. Issawi (1970) evaluated the Middle Eastern development during the period from 1815 to 1914. He traced the presence and effects of nine variables: population, foreign loans, transport, trade, agriculture, industry, education, progress agent and political and economic foreign domination. He found that the backwardness of the area established during that period was due to the low educational and cultural levels, the social structure and the defects of the political institutions. Amin S. (1973) & (1974) on the other hand, argued that underdevelopment has emerged because of three structural defects in the societies: great variation among the internal sectors, the lack of links within the national economy and foreign control. Amin has developed a framework within which he has shown that these defects are intensifying with the passage of time. For Amin the Arab nation is a product of the commercial civilization, unlike the European peasant one where surplus was created internally. In Europe a dialectical relation between proletarianization and money accumulation created capitalism. The Arab periphery could not duplicate this because foreign trade alone cannot create capitalism. Europe was poor, when it was periphery, because of its limited agricultural surplus and its lack of centralization. At the same time, these were the very reasons for its forthcoming wealth: the progress of agriculture and free markets. This line of thinking is to some extent close to Cohen's point of view which states that the absence of surplus products as a promoter of trade was the basic long-term economic handicap in the Middle East. Cohen stated, however, that it is not possible to attribute the economic decline of the area to one or two dramatic events. It is more likely that a chronic structural weakness made these economies unable to resist the overall reversals in the economic and social spheres. See Cook (1970).
20. Mahdavy (1970), p 466.
21. Adelman & Morris (1968a).
22. It is interesting to note that once countries were classified in accordance with criteria other than the per-capita GNP growth rate,

the three Arab oil countries considered (Algeria, Iraq and Libya) fell from the intermediary group to the low potential one, and had zero probability for being classified in the higher group. Ibid., p 274.

23. Adelman & Morris (1968b).
24. Sayigh (1978b), pp 29-30.
25. Economic determinants: 1) resource and performance base, 2) economic structure, 3) industrialization, 4) agrarian reform, 5) capital availability, 6) physical infrastructure, 7) manpower, 8) entrepreneurship and management and 9) Arab economic cooperation.
Political determinants: 1) development orientation of the leadership, 2) planning and plans, 3) the civil service, 4) political stability, 5) the role of the public sector, 6) the degree of participation of the population.
Socio-cultural determinants: 1) education, 2) acceptance of technological change, 3) agents of change, 4) motivation and incentives, 5) social mobility. Sayigh (1978b), pp 27-28.
 The regional Arab cooperation was given a particular weight as an economic determinant of the Arab economies in a number of studies. See e.g. Al Mallakh (1976).
26. Sayigh (1978b), p 144.
27. C f Fatah (1979), p 84.
28. C f chapter 8 for the "easy" form of expenditure and the rentier expansion.
29. Sayigh (1978a), p 17.
30. Nurkse (1964), p 251. It may be surprising that this statement and the argument that followed have come from the founder of the Balanced Growth thesis. However, knowing that Nurkse's point of departure was the lack of demand on the main exports of the underdeveloped countries and that oil is in contrast a commodity that is much in demand explains why he excluded Kuwait and "perhaps" Iraq from the rest and believed that the enclave may solve their problems. See also Nurkse (1953).

6 THE THEORY OF EXHAUSTABLE RESOURCES

INTRODUCTION

As was demonstrated in the earlier chapters, Iraq had undertaken some form of planning. However, it had little, if any, control over the inflow of revenues allocated to the various development plans. The result was, of course, hardly any planning at all, for whenever the revenues increased or decreased, the allocation for investment was inflated or reduced. This state of affairs had resulted in confusing the entire planning process, in shifting the order of investment priorities, in an accumulation of surplus, in sharp economic fluctuations, and in a general frustration.

Once it is recognized that the revenues of the development budget in Iraq come almost entirely from a certain portion of the oil revenues earned by the country, it becomes obvious that any attempt to plan the development budget revenues implies the need to know how much oil the country would extract from the ground and what would be the price for the oil. If an answer to this question can be found, the country would know in advance how much oil revenue it will receive and consequently, could adopt more rational planning methods.

It is the purpose of this chapter to aid in finding an answer to this central question. The search for an optimal price and production time paths for a natural resource such as oil, brings us to the Theory of Exhaustable Resources. The basic problem tackled by the exhaustion theory refers to the identification of the characteristics of the optimal price-output time paths for production from large but finite reserves. The finite stock condition, combined with specifications for the possibility of substituting the resource by producible goods are what give the natural resources their distinctive feature compared with other reproducible goods.

The study of the economics of natural resources has been a neglected field for a long time. Since the decline of the classic tradition in economics with the subsequent abandonment of the rent theory, and until the so-called

oil-price revolutions, only a handful of studies have been made on the subject. From the middle 1970's however, the subject has been of major interest once again, for reasons that are not very difficult to see.

This chapter is divided into four sub-sections. The first will shed some light on the question of ground rent as dealt with in the classic tradition, including the basic question which the classics left unresolved. Thereafter, we will proceed to a presentation of the major outlines of the pure modern theory of exhaustable resources. Another sub-section will be concerned with specifying the conditions under which the pure theory can be applied, and the inevitable violation of these conditions will then be presented. Finally, a number of models designed to elaborate on the realistic world oil market will be reviewed, along with the basic factors which, in our view, constitute their shortcomings.

6.1 RENT IN THE EXTRACTIVE INDUSTRIES

The rent theory was the cornerstone of the classic economic structure. And despite the classic economists' awareness that rent could be extracted in any economic sphere, they elaborated almost exclusively on "ground rent" with reference to agriculture, a sphere which is typically characterized by the laws of diminishing returns. It is interesting to note the paradox that, while the essence of the marginal economics was based originally on the classic's rent theory the important concept of rent was disappearing altogether from modern textbooks.¹

The classic rent theory had very wide implications, affecting the distribution of income and the fate of the society and providing an ethical ground for a taxation policy. For our purposes, however, it is sufficient to deal only with two related questions: what are the reasons behind the existence of rent in the extractive industries and to what extent can rent be a determinant of the exchange price of mineral products?

Unlike other industries, the production advantages of plots of land or mines in those industries that incorporate land as a basic production factor may emerge from a purely natural reason rather than from the more formal reasons concerning the better application of labor and capital.² Yet, the productive capacity of these more advantageous fields may fall short of satisfying the total social demand. Therefore, other, less advantageous fields should be brought into operation. This requires, in turn, that the

market price for the products be set high enough to cover production costs, including an average rate of return on the invested capital, in the relatively poor fields. In this case, the operators of the advantageous fields will earn a surplus, a residual after paying the production factors, including an average rate of return on capital. This surplus is the ground rent, and it is considered to fall to the landowner as a result of the competition among the various operators, the capitalists, for leasing these advantageous spots. In this manner, the very last mine to be exploited, which is also the least good mine of those under operation, must find the market price to be just enough to cover its production costs, i.e. without leaving a residual. All other operating mines except this particular marginal mine will, therefore, earn surplus, rent.

The modern interpretation of the rent theory stresses the advantages that result from the short distance to markets rather than the disadvantages that result from expanding cultivation on both intensive and extensive margins.³

The above representation remains the same, however, even if the location factor alone, rather than the finite size of the cultivated land and its diminishing fertility, is taken into account. Two major conclusions were drawn from the classic rent theory. The first was stressed by J.S. Mill: "So long as any of the land of a country which is fit for cultivation... is not cultivated, the worst land in actual cultivation... pays no rent... A standard is offered for estimating the amount of rent which will be yielded by all other land".⁴ Mill refers, of course, to the remarkable solution provided by Ricardo for determining residually the overall unified rate of profit on the marginal land. The second conclusion was emphasized both by Smith and Ricardo: "High or low wages and profit are the causes of high or low price, high or low rent is the effect of it", wrote Smith. "Corn is not high because a rent is paid, a rent is paid because corn is high", noted Ricardo. The Ricardian rent is, therefore, determined by the price, rather than being one of its determinants.

The Ricardian rent was accepted and analyzed under stationary falling and rising prices of production by Marx. He constructed cases where it could exist even on the worst soil (e.g. a fall in the demand not accompanied by a fall in price), where expansion encompassed more fertile land and where rapid technical changes were taking place.⁶ Marx called the Ricardian rent the "differential rent", and introduced another kind of rent which he called the "absolute rent". The absolute rent can be born by the marginal mine, and is unified in all mines under exploitation. The basic reason behind its exis-

tence is simple. Assuming that the total demand requires that a new mine be taken under exploitation, even if its ore is of poorer quality than all those hitherto under exploitation, there is no reason to suppose that the landowner will lease the land without compensation, just because the prevailing market price of the ore will yield to it no more than the average rate of profit. This particular mine will be brought into operation, i.e. will become a marginal mine, only when it is capable of yielding a return to the landowner. And this will be possible only if the market price of the ore is above the production cost (including the profit) of the marginal mine, thus realizing rent. This rent is absolute because it is equally earned by all mines under exploitation, including the marginal or worst mine.

The absolute and differential rents are qualitatively different, for while the latter is the effect of the market price, the former is one of its determinants. Marx noted that absolute rent could be considered as a mere monopoly tax of landowners, but he also stressed that this is not necessarily the only possibility. Marx was hoping to go beyond this point to demonstrate that absolute rent is a genuine portion of the value, and that it is the difference between the value and the price of production of the land's products.⁷

It is generally recognized today that Marx' treatment here is not wholly satisfactory. The excess of the value over the price of production for any commodity requires that the ratio of the constant capital to the variable capital used in producing that particular commodity be lower than the social average ratio. Marx thought that this condition was typical in agriculture and mining industries, but it is clearly violated, for example, in modern oil extraction activities.

Absolute rent could, according to Marx, spring alternatively from the imposed monopoly price determined by "the purchasers' eagerness to buy and their ability to pay, independent of the price determined by the general price of production as well as by the value of the products".⁸ In this manner, absolute rent, as necessary as it may be, nevertheless cannot be determined from within the model itself. The contemporary writers elaborating on Marx' rent theory stressed the importance of the historical, social and political factors in determining the size of that rent.⁹

Once we depart from the classic tradition, the rent concept becomes more ambiguous. Rent becomes much the same as surplus profit, and which social class receives it is given hardly any importance. When Marshall introduced the short-run and long-run considerations explicitly into economic analysis,

he distinguished between two types of rent: a quasi-rent, referring to the extra earning of any production factor that is in a fixed supply in the short-run only; and a rent which refers to the extra earning of any factor which is in the state of absolute fixed supply. Such a wide interpretation justified defining rent as being all that is paid in the short-run over the operating cost - an outlay, the decrease of which causes no response in the supply.¹⁰

Therefore, rent is closely related to the elasticities of supply and demand. Once the market price becomes, for any single producer, higher than the Marshallian supply price, a rent will be collected. A persistent positive difference between the above mentioned two prices indicates that the long-run supply curve has a less than perfect price elasticity. This, in turn, could be a result of either increasing cost on the margins (diminishing returns), or the presence of a monopoly element in the supply institutions. Rent resulting from the former reason is named "diminishing-return rent", whereas that from the latter is "monopoly rent".¹¹

The enrichment of the rent concept occurred, however, once it was realized that when shortages in supply occur or are expected to occur - i.e. the excess in demand for the product of an industry characterized by definite limited reserve stock and, therefore, imperfect supply elasticity - prices should increase in order to alleviate this excess. The required price increase will depend, ceteris paribus, on the supply elasticity, given that the demand elasticity is low and stationary. Thus, even if the system is assumed to be operating under perfect competitive conditions, the marginal mines must find the market price for its product to be higher than its marginal extraction cost. The difference between the price and the marginal cost is neither a differential rent, since it is earned by the marginal mines, nor a monopoly rent in the strict sense of the term. It is an element that is inherent in the pricing of all extractive depletable natural resources and represents the future profit that is lost through extracting a unit of the mineral now rather than leaving it for the future. The concept stresses the "fixed stock" nature of the resource under the ground and depends largely on the way in which the producers or mine owners interpret future cost, scarcity, demand and such factors. This component, i.e. the difference between price and marginal extraction cost, is given different names in the literature: user cost, scarcity rent, shadow price, net price, royalty, etc. It is a genuine component of the equilibrium price in the resource market, for, as we shall show later, a zero user cost implies that resources are not scarce and will not be exhausted.

A second objection that was raised against Marx' approach was the question of the equilibrium size of his absolute rent: why should the landlord who is strong enough to raise the price of the land's products to the point where even the marginal land could yield a rent, stop at some point and not raise it even further?¹² In the modern literature a theoretical solution to this is given: under conditions of equilibrium, the rent or user cost should start from a specific level and increase thereafter at a specific rate over time, so as to insure that the resource will price itself out of the market at just the right moment, i.e. when the resource price rises to a level where all demand will be eliminated at the same moment as the resource is finally exhausted.¹³

The identification of the user cost under conditions of perfect competition, is conceptually possible, for it represents the difference between price and cost. However, in a more realistic market, where different economic units can exercise various market power, it is impossible to determine, a priori, whether the difference between the price and the cost is an "appropriate" rent resulting from true expectations of future events, or a mere "monopoly" rent. The important point however, is that there does exist a certain genuine item in the pricing of the exhaustable resources over and above the marginal cost element and that this item is not a result of any market imperfection, i.e. is not monopoly rent, but rather "must" exist under perfect competitive conditions.¹⁴

6.2 THE PURE THEORY OF EXHAUSTION

The fundamental question asked in the exhaustion theory is what is the rate whereby a natural resource with finite stock should be depleted? A number of other questions arise from this fundamental one; e.g. what are the conditions under which a constant per-capita income can be sustained while some basic resources are being exhausted?

The solution to the fundamental question requires that a simultaneous determination be made, for both time paths of the resource use and of the resource price. The standard application of the exhaustion theory, however, pays more attention to the resource use path because the identification of the price path "cannot be predicted by a formula as simple as that of output allocation".¹⁵

The equilibrium norm in the resource market was originally laid down by

Hotelling (1931) and warranted by the flow-equilibrium: "Since it is a matter of indifference to the owner of the mine whether he receives for a unit of his product a (net) price P_0 now or a (net) price $P_0 e^{rt}$ after time t , it is not unreasonable to expect that the (net) price will be a function of the time of the form $P = P_0 e^{rt}$, r being the force of interest."

Stressing the same concept, Solow (1974a) introduced it as a condition for stock-equilibrium in the resource market: "A pool of oil or vein of iron or deposit of copper in the ground is a capital asset to society and to its owner, much like a printing press or a building or any other reproducible capital assets".

Being a capital asset, the resource should produce a return which, in equilibrium, must equal the interest rate. But since this return cannot be collected before the resource is extracted, the net price of the resource while under the ground must grow at a rate equivalent to the interest rate.

Hotelling, followed by many others, employed a cost function utilizing the calculus of variation in order to determine the equilibrium time path of extraction.¹⁶ More recent studies employ production functions. In both cases, the criterion function refers to the present value of the future profit of a firm or of the industry. The same results, however, can be deduced with reference to an aggregate social welfare function.

It is well established in the theory that a resource is said to be efficiently allocated if and only if each produced or extracted unit has the same value in various uses. However, as the inherent dynamic nature of resource economics has been frequently recognized, the static efficiency criterion is often ignored for the sake of accounting for the dynamic intertemporal efficiency. I.e. the resource must have equivalent value whenever it is consumed along the time path of the resource use.¹⁷

Assuming that the social welfare is measured by some increasing function of aggregate consumption of output, a zero extraction cost, and that static efficiency is acquired accidentally, then it will be possible to establish that the resource is efficiently allocated if, and only if, its marginal product is growing at the rate of return on capital.

In a perfect competitive environment, the marginal product equals the price, while the return on capital matches the interest rate. The equilibrium resource price will consist of two components: the extraction cost (which is nil under the simplification assumption) and the net price or scarcity ren-

tal. Once the cost is positive but constant, price can no longer increase at the interest rate. The equilibrium requires in this case that the gap between the price and the extraction cost, i.e. the net price or user cost, grow exponentially at the interest rate. If the extraction cost is increasing, efficiency will require that the price rise at a rate which is the "weighted average of the interest rate and the rate of change of costs, the weights being respectively the fraction of the selling price made up of rent and of costs".¹⁸

The scarcity rental is defined as the shadow price of the resource under the ground, reflecting future cost of extraction. It is inherent in all depleted raw materials, and is an important phenomenon for assessing the time paths of these materials.¹⁹

The above exposition can easily be extended to the monopoly market. Assuming that the single extracting firm aims at maximizing its discounted total future profit, the extraction path will be characterized by matching between the firm's marginal revenues on the one hand, with its marginal extraction cost plus marginal user cost on the other. In the simple case of zero extraction cost, both the marginal revenue and the marginal user cost will grow exponentially at the interest rate. If the cost is a positive constant, the difference between marginal revenue and marginal cost will increase at the interest rate.²⁰

A mine operator, acting under perfect competitive conditions, will set his resource extraction time path such that his marginal extraction cost will match the market resource price net of the user cost. Such a time path must insure an exponential increase of the user cost throughout the time, at the interest rate. Naturally, this assumes that a certain level of knowledge about future prices is available to the operator, a requirement which caused Adelman to claim that the problem addressed here is "not an interesting or important problem, nor is user cost a helpful concept".²¹

The above deduced result is called the "Hotelling rule". It is considered by Solow (1974) to be the "fundamental principle of the economics of exhaustable resources", having an importance that "is hard to be overemphasized".

The Hotelling rule is, however, a necessary but not sufficient condition for efficiency. The rule defines the pace upon which net price will increase in order that the resource will be of equal value at different times, and therefore, allow that more output be produced from the fixed available stock.

The rule, however, does not ensure that all the reserves will be extracted, a condition without which efficiency will remain less than maximum. The exhaustion of all the fixed reserve, taking the Hotelling rule into account, will depend upon the initial price. For, assuming a fixed interest rate and an exponential increase of the price, it will be possible to calculate the flow of the reserve along the time path. Depending upon the initial price, the needed reserve may be larger or smaller than the available one. The time path is not feasible in the former case and inefficient in the latter.

Furthermore, the economy may settle on one of such paths without discovering its inefficiency until it is too late. What has been said about the initial price is also valid for the absolute level of the interest rate. If the initial price is too low, the resource will be exhausted while some consumers are still ready to offer even higher prices for it. If the resource price started from too high a level, the demand for the resource will fall to zero before final exhaustion occurs.²²

These difficulties can be avoided by forcing through another assumption: the entire stock of the resource will be depleted. Once the Hotelling rule is supplemented by this assumption, it acquires the necessary and sufficient conditions for assuring an intertemporal efficient pattern for the natural resource use.

Assuming that the efficiency question is resolved, the other question that remains is: what efficient time path should be selected to assure optimality, i.e. an acceptable distribution of the efficient output along the time path?

There is a growing amount of literature devoted to elaborating on this question. Assuming usually that optimality in each generation is solved, the standard application aims at maximizing the present value of the discounted utilities of various generations within a finite time horizon. The analysis is complicated by incorporating two inescapable variables: population growth rate and capital accumulation, both of which will largely affect the welfare of the future generations along with the rate of the use of the resource. The properties of the optimal time path depend on the particular parameters and assumptions that the various models apply. But it is recognized that this sort of optimality analysis faces many obstacles, the most important of which is the inability to decide upon the true preference of future generations, let alone the quite restricted assumptions needed in such an analysis.

One point of special importance in this respect is the discount rate used to discount the welfare of future generations, i.e. the weights put on the welfare of different generations. Beside those who argue as to whether or not any positive discount rate is justifiable some asked whether "the market discounts future profit at the same rate as the society would wish to discount the welfare of future inhabitants of the planet".²³ It is widely recognized in modern literature that the market interest rate exceeds the social rate of time preference, i.e. the resources will be exhausted faster than the optimality required. As the selection of specific discount rates involves a value judgement concerning the importance assigned to future consumption, some economists argued that the selection of the optimal path falls into "the realm of ethical or normative economies".²⁴ Consequently, this implies that the market cannot, without intervention, be guaranteed to follow the optimal time path.

6.3 INEVITABLE IMPERFECTION

As mentioned earlier, the goal function in the resource markets, if related to profit, should refer to maximizing the present value of all discounted future profits. Some economists, however, maintained that extractive firms would tend in reality to maximize their current profit, i.e. equating prices and marginal extraction cost, and therefore setting the scarcity rental at zero. But based on the Kuhn-Tucker generalization of the Lagrange multiplier, Gordon (1967) noted that once the multiplier (which in this case is the scarcity rental) is put equal to zero, the solution will imply a use of only a portion of the available reserve. Thus, when firms are treated as current profit maximizers, it is implicitly assumed that no final exhaustion is to take place.²⁵

The question as to what are the conditions under which the market mechanism is thought to allocate the exhaustable resource efficiently has received some of the attention it deserves in the literature. Gordon (1967) argued that the purely competitive market solution need not be efficient, and it is odd that the inefficiency does not arise from any market imperfection. This conclusion was reached by comparing the price that would result once a socialist management of mines was in existence with that resulting from separate private managers. Since, in the latter case, production cost in the different mines would not necessarily match up and therefore cost would not be at a minimum, resource price under the socialist management would be lower. Prices under individual operators will rise at a faster rate and not

all the resource will be exhausted, i.e. "with rapid price rises, some firms simply do not have enough time to get rid of all their reserves at a profit".²⁶ It is for the sake of eliminating such possibilities that the necessary efficiency condition was supplemented by the sufficient one. But the possibility of such an inefficiency occurring is one thing, and the possibility of ruling it out by restrictive assumption is quite another. This is certainly a dubious assumption which eliminates the essence of the dynamic analysis, for "changing economic conditions will change the usable amount of the resource".²⁷

The apparent deviation of real markets from those postulated in the theory was pointed out already in Hotelling's celebrated article. He noted that "there are in extractive industries discrepancies from our assumed conditions leading to particularly wasteful forms of exploitation which might well be regulated in the public interest".²⁸ This idea, however, is not held by everyone. Some think that the imperfection in the real market will lead to a second best situation and that government intervention will not lead to any improvement.²⁹

It is recognized in economic theory that a competitive economy can achieve the best allocation of resources only if it is characterized by a number of properties, including: 1) the existence of a full set of future markets, 2) the existence of a full set of risk markets, and 3) the absence of all forms of externalities. It is also a well-known fact that there is no sector in the economy that is not affected by market imperfection with regard to these three aspects. But for certain reasons, it is thought that these "may in fact be more serious in the intertemporal resource allocation of natural resources than for most other areas of investment".³⁰

Future markets are needed to provide accurate future prices for the sake of present investment decisions. This is most important in extractive industries because they require huge investments in highly specialized capital goods with a long gestation period. Furthermore, most minerals, notably the energy resources, have a highly inelastic demand curve. Stiglitz (1975) identified several factors that make the predictions of energy demand and supply functions more difficult than for other goods. This in turn puts further emphasis on the importance of future markets. Stiglitz showed also that even if short-run equilibrium is prevailing, the absence of future markets will deprive the economy of the mechanism that ensures the convergence of the short-run equilibrium into a long-run equilibrium. Finally, it is also argued that, due to the lack of future markets, a small change in the prices expected for the resource in the short-run, may lead to a very large increase in the

current price, i.e. the user cost increases at a higher rate than that of the interest. Thus, there is instability inherent in these markets, and "market forces rather than working to bring the economy back to equilibrium, work to move it further from it".³¹

The absence of a future risk insurance market represents another source of trouble. It is maintained by some economists that "uncertainty and risk permeate most aspects of natural resource industries to a greater degree than in many other areas".³² There are two kinds of risk that can be pointed out here: first, the technological one associated with the exploration and drilling operations, and second, the risk associated with levels of future demand with the possibilities of early discoveries of substitutes and risks associated with maintaining an adequate reserve size relative to future demand. It is in the different views concerning the ability of the real markets to handle the risk factor that economists disagree as to whether markets will lead to a Pareto optimal allocation, to a constrained Pareto optimal, or will fail to acquire any optimality.

The risk of early discovery of substitutes is accounted for in the theory by modifying Hotelling's rule in order to allow the scarcity rental to increase at a rate which represents the summation of the interest rate and a probability factor concerning the discovery of new substitutes at an early date, i.e. before the exhaustion of the reserves. This requires in the first place, that mineowners be risk-neutral. But more importantly, it has been noted that while this method is becoming customary, "it is generally recognized that it leads to errors".³⁴ For this requires the restrictive assumption that the stock of capital and resource will be judged to be totally devoid of value after the date of the emergence of a substitute.

The question of externalities seems also to be inevitable in the extractive industries. It is well established in the theory that "one cannot expect markets to allocate resources efficiently when externalities are present".³⁵ Externalities are witnessed at various stages of the natural resource industries, but it is most obvious during the primary exploration stage. Peterson (1975) identified two externalities in this respect: an external economy emerging from the fact that any explorative drilling provides valuable information at no cost to neighboring landowners, and an external dis-economy of common property type, i.e. exploratory drilling during certain periods leads to increases in the present value of the cost of all future exploratory drilling. Peterson argued that, because of these externalities, oil

exploration activities in the US had been discouraged and called for policy measures to compensate their effects.

Stiglitz (1975) added another externality with reference to the production stage: a specific reservoir may be exploited by more than one well by different owners. The marginal driller does not, in this case, consider the effects of the output of his well on the productivity of the other wells. Thus, private benefits exceed the social ones. The final kind of externality to be mentioned here refers to a public-good externality and is related to various forms of pollution, residuals and material balance concepts in general, the social costs of which man is becoming more and more aware. The issue seems to be typical in the natural resource extraction, transportation and processing industries.

It was apparently in reference to such questions that leading economists in resource economics like Dasgupta and Heal commented succinctly: "The claim that a decentralized market competitive environment will ensure an efficient utilization of natural resources is a very tenuous one".³⁶ The natural question to be asked here is: what remains then of the pure theory of exhaustion and does it have any significance? As might be expected, economists are not in agreement here. The discrepancy existing between the markets postulated in the theory and the real markets is recognized by everyone. The disagreement arises, however, with respect to the implications of this discrepancy on the practical uses of the theory. Some have argued that "long-run economic forces, even if they are expressed imperfectly, may be a better guide to action than the decisions of legislators and bureaucrats".³⁷ Others have adopted a softer stand: when the assumptions of the theory are violated in practice, the theory can still serve as a tool both for predicting alternatives and for evaluating the relative merits of proposed changes.³⁸ Other economists would like to consider the elaboration presented in the exhaustion theory as being merely an intellectual exercise, and have therefore adopted alternative methods for identifying and recommending policies with regard to questions of natural resources. It may be interesting to note that in his attempt to apply a modified version of the theory that would explain the events which took place in 1970 in the world oil market, Heal could not trace "any fundamental economic change" behind the substantial price increases. The explanation depended rather on other exogenous factors, the most important of which was "the way people perceived economic realities".³⁹

The exhaustion theory, although having provided us with important insights

on the pricing process and the peculiarities and equilibrium conditions in the natural resource market, seems to have limited importance with respect to our goal of outlining a proposition for oil production in an oil-based economy. But, before passing judgement, it is important to see how some aspects of the exhaustion theory have been incorporated in various models which exhibit somewhat realistic world oil market.

6.4 PRICE AND OUTPUT MODELS FOR THE WORLD OIL MARKET

In contrast to what we have seen earlier when dealing with the general outlines of the exhaustion theory, the models designed for the oil market have taken into account the fact that this market is certainly neither perfectly competitive nor totally monopolized. Also, these models aim at defining the equilibrium time paths of both the oil price and the output rate explicitly. These paths are either deduced simultaneously, as in the full-optimization models, or determined in successive stages.

The standard application of the exhaustion theory on the world petroleum market starts by identifying two different major groups of petroleum (or energy resource) suppliers. The first one is OPEC, flatly labeled as a monopoly and the second is the competitive fringe consisting of all other non-OPEC oil (or energy) producers. The advantage OPEC is thought to have over the producers in the competitive fringe differs in the various models, but it is generally assumed that OPEC has a larger oil reserve than does the fringe, rather than any advantage related to cost functions. Extraction cost is often assumed to be constant.⁴⁰

The postulation of the institutional nature of the industry seems to fit in with the use of the so-called Cournot-Nash non-cooperative game equilibrium.⁴¹ Each firm in the competitive fringe takes the price path determined by the cartel as given, and then selects its own output rate. The cartel, in its turn, takes the output path of the fringe as given and determines the price path in accordance with the unsatisfied demand. Each firm in the competitive fringe as well as the cartel aims at maximizing the sum of its discounted profit. The cartel is therefore, behaving as a pure monopolist towards the excess demand, i.e. the total demand minus the given competitors' output. The fringe, on the other hand, is behaving as if a pure competitive environment existed, taking the oil price as given. The application of the efficiency criterion deduced earlier to each market type separately will lead to the determination of the unique price path. The characteristics of that

unique path, in short, will be: at a certain price level, the competitive fringe will complete its sales, i.e. exhaust its reserves. Prior to that point, equilibrium in the both types of markets will require the oil price and the cartel's marginal revenue to grow exponentially at the market interest rate. This implies that price should remain in constant proportion with the marginal revenue, which, in its turn, requires that the elasticity of the excess demand be constant. After that point, the cartel will be the sole producer in the market and will set the price in order to ensure the exponential growth of its marginal revenue. The price here cannot possibly grow at a faster rate than that of interest. Considering the specific market structure and the assumptions presented above, Salant (1976) concluded: "The formation of the cartel raises the discounted sum of profits of the competitive fringe by an even greater percentage than those of the cartel".⁴²

It has been shown by Ulph & Folie (1980) that this result will depend on the strict assumption that an identical cost function (linear or convex) prevails in both types of markets in the industry, and more importantly, on the assumption that no further oil supplier enters the market after the formation of the cartel. Therefore, if there were a group of firms concerned with oil production at the same time as a number of other firms were standing by because of the substantial cost advantages of the former, and if some of these firms already engaged in oil production formed a cartel and raised the price to the extent that the other firms found it profitable to start producing, then the formation of the cartel could lower the profit of the competitive fringe. "This is because of the reduction in the value of the reserves which were developed earlier than would have occurred under perfect competition."⁴³

These types of models, while outlining the techniques and conceptions used for determining OPEC's optimal pricing and output policies, do not provide explicit solutions. A number of models, however, have been developed which produce concrete empirical results. These models utilize the simulation (dynamic or static) or the optimization techniques. In almost all of these models, OPEC is treated as a price-leader in the world oil market, with the aim of satisfying the residual or excess demand, i.e. the world demand for oil estimated on the basis of some convenient function, net of all non-OPEC oil supply.⁴⁴ A criterion function is introduced thereafter, whereby OPEC is supposed to aim at maximizing that function subject to a set of appropriate conditions. Generally speaking, OPEC's problem lies in the dilemma that the higher the oil prices in the near future (which are made possible by the rigidity of the short-run demand curve for oil), the lower

will be its revenues and the smaller will be its share of the market in the far future. As can be expected, the results will depend heavily on the particular values assigned to the parameters in the various models.

Ben-Shahar (1976), after determining the residual demand for oil, postulated the criterion function for the OPEC cartel as being the present value of the net gain from the oil reserves. This goal function consists of two components: the first represents the present value of the net revenue acquired during the planned period, and the second represents the discounted value of the remaining reserves thereafter. The final form of his criterion function, however, referred to the maximization of the net gain from the sales of oil during the planned horizon. It measures the present value of the net revenues from oil sold minus the present value of this oil if it had remained underground for the post-plan period. After inserting various price scenarios in the model in order to select the one that maximizes the OPEC criterion function, Ben-Shahar concluded: "1) the best constant price policy (\$ 11/bbl) is inferior to any other policy. 2) the best one-shot price hike (\$ 4/bbl to \$ 17/bbl in 1982) is better policy than the best gradually rising price (from \$ 7/bbl at 8%)".⁴⁵

Blitzer et.al. (1975) presented a more sophisticated model, having the same end in mind. Again, OPEC is confronted with a residual demand. The criterion function consists of two components: direct and indirect benefit. The latter is represented by the value of oil remaining underground after the planned period (assumed to equal one-quarter of the oil price prevailing at the end of the plan). Direct benefit is represented by the net stock of the OPEC foreign exchange portfolio at the end of the planned horizon (net oil revenues plus return from investments abroad minus imports). Six price scenarios, accompanied by various value combinations of parameters, were inserted in the model. The "best" solution deduced implies that OPEC should produce at maximum capacity, i.e. put the oil price at minimum level. The "best possible" price path, however, favored a continuously decreasing price to reach the level of \$ 7/bbl. All the results of the models were found to be very sensitive to the postulated value of the expected long-run price level of oil, which will determine the price of the "backstop technology", i.e. the price beyond which OPEC oil will be fully substituted by alternative sources.⁴⁶

A somewhat similar result to the one reached by Ben-Shahar was obtained by Cremer & Weitzman (1976). As before, OPEC is presented as being an oligo-

polist aiming at maximizing the present value of its profit on the basis of satisfying the residual oil demand. The competitors will aim towards a similar end, subject to increasing cost function and convenient bound on their production capacity. The solution of the fringe problem will provide the level of their oil supply, which will be subtracted from the total world demand in order to arrive at the residual oil demand left for OPEC. Assuming different interest rates for OPEC and the fringe, a 3% annual growth rate of the world oil demand and of the non-OPEC oil production capacity, the model leads to the following basic result: "Petroleum prices should stay approximately constant, at a level close to the static monopoly price".⁴⁷ (I.e. raising the price from about \$ 10/bbl in 1975 to about \$ 20/bbl in the early years of the next century.) This result implies that 1) the oil price increases were "once and for all" a phenomenon due to the formation of OPEC, and 2) oil prices should remain approximately constant during the next 20 years.

This conclusion, that the rise in the world oil prices can be attributed to the effective monopolization of the oil market by OPEC which aims at maximizing its discounted profit and thereby setting the oil price in the neighborhood of the long-run monopoly price, has also been reached by Nordhaus (1979). The basic idea of the model here is quite simple and is based on the "backstop technology" concept: at a certain price level, a perfect substitute for oil would come into being, thus putting an upper limit on the resource price increase. Once the price of the substitute, the rate at which the equilibrium price of oil increases, as well as the point in the future in which the oil price and the substitute price will coincide are known, it will be possible to determine the efficient price of oil at any point in time. The monopolist, however, would not wait for the gradual approach of the price of oil to coincide with the price of the substitute. Nordhaus showed that under certain assumptions concerning the shape of the demand and cost functions, the monopolists would fix the oil price at just below the price of the backstop technology during most of the lifetime of the oil reserve.⁴⁸

An econometric model to estimate the total world demand on energy in four different sectors was thereafter constructed by Nordhaus. In a latter stage, all the different forms of energy resources, including petroleum, were classified in terms of their availability, level of development and cost. By comparing the supply and demand conditions, it was roughly concluded that a backstop technology for all exhaustable energy resources will be reached sometime between the years 2070 and 2090. For our purposes, a backstop price

for petroleum will exist earlier, and the substitutes will be oil shale or coal gasification. The efficient user cost of petroleum was thus computed at \$ 1.7/bbl in 1975, if perfect competitive conditions were prevailing. The equilibrium barrel price will be the user cost plus an extraction cost of \$ 1. Efficiency will require that this price increase at a 4% annual rate. In order to deal with a somewhat more realistic oil market, an adjustment on the demand function so as to incorporate a variable elasticity was made. Oil producers were divided up between the monopol (OPEC) and non-OPEC. The latter were assumed to behave competitively with a 7% maximum growth rate of their capacity. The model was solved under a zero output for OPEC in order to determine the outer upper limit of oil prices, beyond which no wealth maximizing monopolist would go. The solution proved to be very uncertain and sensitive. For a short-run price elasticity of -1.1, the upper limit price started from \$ 9/bbl in 1975 and increased at an average rate of 5.5%. With an elasticity of -0.6, the solution implied figure values of \$ 11.8/bbl and 4% respectively.

The last model to be reviewed here differs from all the previously mentioned in that it does not treat OPEC as a wholly unified body.⁵⁰ In the model constructed by Hnyilicza & Pindyck (1976), OPEC itself was divided into two parts: the "saver countries" with little immediate need for cash income and the "spender countries" with a higher rate of discount for future profit. By defining the member countries of each group, the OPEC saver countries were found to be more fortunate with respect to oil reserves than the OPEC spender countries. The model aimed at identifying the optimal trajectories for both oil price and output shares within OPEC that would maximize the weighted sum of the discounted profit for both parts. The model contains, therefore, two control variables, the optimal price and the output shares. If the latter were allowed to vary through time, optimal solution would call for a state where the saver countries would set their production at zero until the spender countries exhausted their reserves. This solution is obviously not attractive. The selection of the weight assigned to each part's profit in the total profit criterion function was based on a bargaining theory: each part's weight must be proportional to the loss it would otherwise have sustained if no agreement had been reached.⁵¹ If no constraint was imposed on the production shares, the theory implied a weight of 35% for the saver countries. But if the production shares were bound to their historical levels (65% for the saver countries), the theory assigned a weight of 30% to the saver profit in the total profit function. In both cases, however, the "best" price would start from a level of \$ 15/bbl in 1975, and end at \$ 20/bbl in 2010.

When output shares were fixed, the price declined to \$ 10 in 1980 and increased gradually thereafter. If shares were left free, the spenders would exhaust their oil reserves in 1985, at as low a price as \$ 4.5/bbl. The savers would then enter the field, inducing a sharp rise in price, and with gradual price rises thereafter.

No attempt will be made here to compare the various models with respect to their structure or their results. Such a comparison could only be made at great length but would seem to have little practical importance.⁵² It is sufficient for our purposes here to state briefly that the different, sometimes contradictory, solutions arrived at in the various studies are essentially due to the variations in the structure of the models, in their assumptions, their specification of parameters and in the applied functional relations. A basic question remains to be answered: does our review of the norms of the exhaustion theory and of a number of models designed specifically for the oil market provide us with the necessary tools for proposing how an oil country, such as Iraq, should formulate its oil extraction program?

In most of the models dealing with the international oil market, OPEC is treated in practice as a monopoly rather than as a type of cartel. OPEC is therefore, considered to be a fully cohesive body. Even in those models which recognized that OPEC is a cartel, its members were still divided into two unified sub-groups, corresponding to the manner in which the energy producers were originally divided. Of course, OPEC cannot do better than act as a monopoly. But this implies that a criterion for allocating the output which the OPEC members should produce is in existence. However, no mention of such a criterion is made in these models. Nor do they suggest that the extension of the general approach they adopt will provide such a criterion which ought to take into account the genuine differences among the various OPEC members in time preference, socio-political orientations and sizes of reserves and production capacities. In other words, even if these models were able to determine in an optimal manner at which level OPEC should put its oil prices, the question as to how much an individual member should produce remains unanswered.

What is more important, however, is the fact that in all of the models reviewed, the criterion function which OPEC is supposed to be attempting to maximize represents the net gain or the profit resulting from extracting and exporting crude oil. It is apparent that profit maximizing is a well-established principle in the literature and a criterion that lies ready to

hand. But it is equally apparent that this criterion cannot represent true social benefit, except under strictly controlled conditions that almost never exist in practice. One of the side effects of this criterion is the passiveness of OPEC towards the residual oil demand. Invariably, OPEC is supposed to tend towards satisfying that demand. This point was not noted in the study by Fischer et.al. (1975), although they noted that the competitive fringe is often supposed to behave very symmetrically and almost naively in these types of models.

The models, being content with the maximization of the net gain earned by OPEC, overlooked the very important question as to how and where these net gains would be utilized.⁵³ The internal economic conditions within the OPEC member countries played no role in deciding upon the oil production policies adopted. Such a procedure can hardly be tolerated, especially when one takes into account that several of the OPEC members had declared their goal as being to replace the exhaustable wealth by a self-sustained and highly advanced local productive capacity.

Finally, one may ask if the oil prices, in a realistic oil market and in the light of the experience of recent years, have actually been determined in the optimization manner that is prescribed in the theory and models? evidence suggest otherwise. In a realistic world, the pricing process of such an important strategic commodity as oil seems more likely to be also a result of power relations and political interest, alongside the direct economic factors.

We may conclude therefore, that the question of how much oil Iraq should produce remains open. Elegant as they are, the models do not - and perhaps were not designed to - provide concrete proposals for how an oil exporting country should formulate its extraction policy in order to approach its basic goals. In the following chapter our proposal for establishing a firm linkage between the oil extraction program and the internal absorptive capacity will be introduced.

CONCLUDING REMARKS

The attempts of the classic economists to incorporate the element of absolute rent into the equilibrium price of the natural resources were not carried out satisfactorily. This end was achieved later, but in conjunction with marginal pricing conceptions. The exhaustable resource had to be redefined for

that purpose as a capital asset. This reaffirms the conceptional difference that exists between what the classics called "rent" and what, in modern welfare economics, is called "user cost", although both terms represent the excess of the equilibrium price over the cost.

The exhaustion theory is concerned basically with questions of partial equilibrium: the properties of the price-output time paths that assure the efficient utilization of an exhaustable resource. In a perfect competitive environment, the theory concludes: producers would set their production at such a level that would allow the resource price, net of the extraction cost, to increase exponentially at the market interest rate. It is necessary, however, to supplement this condition with another, which is to insure that all of the resource underground will be extracted. Once both of these conditions are satisfied, efficiency can be attained.

The perfectly competitive market is, of course, purely imaginary. It remains important, however, to stress that there are a number of specific reasons which make inevitable the deviation of the natural resource markets from those postulated in the pure theory. Furthermore, it is recognized that the familiar market imperfection has more important consequences for the resource markets than otherwise.

Several attempts have been made to apply some of the norms of the exhaustion theory on the realistic world oil market, a market that is easily recognized by its imperfections. The general aim of these models was to identify the optimal oil price and output policy that would maximize the present value of the net gain of OPEC. Various types of results were outlined which, more often than not, proved to be highly sensitive to the price elasticity of the demand for oil, the cost and the time for the emergence of oil substitutes. OPEC, in most of these models, was treated as a unified body acting unanimously in questions of oil price and output. The question of how much and when OPEC should earn the revenues from its oil was treated as a separate question from the one of utilizing these revenues. The models paid no attention to the internal economic structure of the individual OPEC countries, nor to their varying need for revenues, a factor which might very well affect their decisions concerning output rate.

The type of objective function used in the models and the implicit assumption that oil extraction rate is a separate question from that of the utilization of the oil revenues are views that have very serious implications.

It is assumed, for example, that the oil countries are merely interested in earning more money, that they are indifferent to when they receive their oil revenues, that there is no limit on investment opportunity and that actual oil prices are determined only by direct economic factors. The implication that investment opportunity is always open is particularly significant. Actually, it rests on the assumption that if OPEC's oil revenues, as determined in an optimal manner, are large, an external outlet exists which is always capable of absorbing all that cannot be used internally. Furthermore, the oil producing countries are assumed to be indifferent to the internal or external outlets for their oil revenues. Such assumptions neglect the fact that there is an increasing reservation among the oil producers against accumulating a portfolio in foreign countries. Further, there are very serious economic and socio-political internal consequences resulting from the inflow of oil rent in excess to what can be meaningfully utilized in achieving the ultimate ends of an underdeveloped oil exporting country.

NOTES

1. The elimination of the peculiar stature of land in the economic theory was done by generalizing this peculiarity rather than by refuting it. Walras (1954) concluded: "Thus all that remains of Ricardo's (differential rent) theory after a rigorous critical analysis is that rent is not a component part, but a result of the price of production. But the same thing can be said of wages and interest". Wickstead also arrived at the same result around the same time, although Walras hinted that Wickstead copied his results: "It is equally correct to say that wages are not the reason, but the effect of the exchange-value of commodities, and this is also true for interest". Pp 292-294.
2. Market price, in the classic theory, is governed by production cost of the average producer. Productivity advantages which some producers have in normal industries give rise to surplus profit over the average profit. This surplus profit springs from the labor and/or capital itself due to "new and improved, better than average means of production and method of production". Competition will tend to generalize the surplus profit gradually until it replaces the average profit in the sphere. This implies the exclusion from the market of all those producers who are unable to adjust themselves to the new improved conditions.
3. See for example Johanson (1973), pp 79-80.
4. Cited in Emmanuel (1972), p. 209.
5. Ibid.
6. See Marx (1959), Part VI, pp 614-802.

7. The Marxian value refers to the sum of paid and unpaid labor (surplus value) embodied in any commodity. The price of production refers to the cost of inputs plus a unified rate of profit on invested capital. In his controversial transformation problem, Marx stated that total surplus value produced by the total capital is redistributed among different capitalists, in the form of profit such as to assure them equal rates of return on their invested capital. "Landed property hinders such an equalization among capital invested in land... and takes hold of a portion of the surplus value..." Marx (1959), p 771.
8. Ibid., p 775.
9. See for example Massarat (1980) and Nore (1980), p 70. Massarat attempted to apply the major outlines of Marx' rent and value theories on the real world energy and oil markets. His basic conclusion implied that the price of production of American coal regulated the market prices of all other sources of energy. Since crude oil embodied higher labor productivity, it was earning a rent. The oil price depression during the 1960's was explained by the increases in the oil share of the world energy consumption, a case which was ruled out in Marx' treatment. Massarat failed, however, to use the same tool to explain the oil price boom in the mid 1970's. He argued rather that this was due to "the development of capitalism in the oil-rich societies themselves." p.42.
10. Adelman (1972), p 42.
11. Davidson, Falk & Lee (1975). Mamalakos (1978) defined three different determinants or components of mineral depletion rent: the Ricardian rent, the short-run rent resulting from short-lived boom in demand and, finally, the efficiency rent resulting from the extra efficient use of inputs. The second type is, in fact, a temporary absolute rent, but refers here to the demand rather than to the supply conditions.
12. Emmanuel (1972), p 218.
13. Nordhaus (1979), p 9.
14. It should be noted that even when the user cost concept is introduced, the pricing process remains marginal in its essence. For example, when increasing cost conditions are assumed, cheaper resources should be extracted before dearer ones. If the latter are extracted first, the former resources will remain unutilized. This is contradicted by the highly arbitrary discovery of exceptionally advantageous fields. It is for such reasons that Adelman (1972) tried to "rationalize" the finding of oil and considered the recent discovery of some of the world's greatest and cheapest oil fields as being "accidental". See Al-Wattari (1980) for a counterviewpoint.
15. Gordon (1967), p 252.
16. E.g. ibid. and Cummings (1969). It is noted repeatedly in the literature that the basic norms of the exhaustion theory were laid down by Hotelling in as early as 1931, and that much of the subsequent works were a mere reinterpretation or modification of Hotelling's works. A few years before Hotelling's study was published, Ise (1925) elaborated on the same problem, but in a completely different manner. In-

stead of considering natural resources as capital asset, Ise emphasized that no theory can be furnished to explain the value of a natural resource before establishing whether a substitute for it will be forthcoming or not. If not, "we may perhaps conclude that the exhaustable resource should be sold at such a price and therefore consumed at such a rate that the price will rise about two per cent a year", i.e. assuming that the wants of the next generation are rated less than one-half as important as our own. If substitutes are assumed to be forthcoming, then "prices of the resources... should be fixed at a point approximating the cost of producing adequate and satisfactory substitutes". Ise made it clear that "neither a monopoly nor competing owners would ever fix the price... high enough". He advocated therefore, public control over the natural resources. At some points the methodology of Nordhaus (1979) is very close to these ideas.

17. Feige & Blau (1980), p 117.
18. Heal (1977), p 91.
19. Peterson & Fisher (1977), p 685 and 692. Davidson, Falk & Lee (1975), p 119.
20. There is, however, conflicting views as to whether monopoly produces at a faster or slower rate than competitive firms. Hotelling supported the latter view on the grounds of the "general tendency for production to be retarded under monopoly". Many other economists, notably Solow (1974a), supported the former view. The question depends greatly on the demand elasticities and the production cost. If the elasticity is constant and production cost is zero, the resource use and equilibrium price paths will be identical under monopoly and competitive environments. If the elasticity increases over time, and/or extraction cost is positive, the monopoly price path will be above the competitive one in the initial period and below it thereafter, i.e. monopoly produces at a slower rate initially and at a faster one later. On the whole, however, the resource lifetime will be longer under monopoly. Cf Heal (1977) pp 91-13.
21. Adelman (1972), p 40.
22. Stiglitz (1975), p 61 and Herfindahl (1967), p 65.
23. Solow (1974a), p 12.
24. Feige & Blau (1980), p 123.
25. Gordon (1967), p 276. Herfindahl (1967), pp 83-85, "solved" this dilemma by considering the user cost as a very small but positive figure. It can be ignored, therefore, and firms can well tend to maximize their current profit. But it remains positive which implies that total exhaustion will take place.
26. Gordon (1967), p 283. Commenting on Gordon's article, Goldsmith (1974) stated that minimizing cost can only be meaningful once both the extraction cost and the user cost are considered together. As neither a competitive firm can, nor a socialist manager would, affect a certain high but equilibrium price, the efficiency solution in both markets must be identical. This requires, however, that the welfare function is represented by a certain profit formula on the one hand, as well as

the acceptance of the fact that the user cost represents a real social cost to the society.

27. Brady (1973), p 120.
28. Hotelling (1931), pp 143-144.
29. Weinstein & Zeckhauser (1974), p 87.
30. Stiglitz (1974), p 139 and Stiglitz (1975), p 55.
31. Stiglitz (1975), p 59. Heal (1975), p 120, deduced a similar result when an unexpected price increase occurs: an oscillatory movement of supply and prices. Once the accurate expectations of future prices are not assumed, partial equilibrium will be attained only when the final exhaustion occurs.
32. Feige & Blau (1980), p 127.
33. Stiglitz (1975), pp 78-80. Boulding (1977) also questioned the ability of the competitive structure and relative prices to provide adequate anticipation of future scarcity for the resources that are available at present in relative plenty. He maintained also that "uncertainty is much larger ... in the case of private decisions, which only involve a small part of the system and cannot anticipate redistributions, than it is in the case for society as a whole". P 817.
34. Dasgupta & Heal (1974), p 27.
35. Feige & Blau (1980), p 132.
36. Cited in Ibid, p 120.
37. Weinstein & Zeckhauser (1974), p 87.
38. Feige & Blau (1980), p 110. See also Fischer et.al. (1975), p 366.
39. Heal (1975), p 135. For an interesting exposition of the exhaustion theory and a criticism of its basic conceptions, see Pearce (1975).
40. If the cost functions in every extractive firm is upward sloping, OPEC, being a cartel with the largest reserve, can extract at the same rate as other firms but at a lower cost. In the mid 1950's, a theory was developed to explain the "inherent surplus" in the oil market. The theory claimed that the oil industry is a typical example of the decreasing cost (increasing return) type, characterized by its unlimited economies to scale. The more oil extracted, the less will the cost (price) be. Individual producers, acting individually, must therefore eventually operate at a loss. Otherwise, some kind of understanding must be reached among the various producers, i.e. cartelization is inevitable in an increasing return industry such as oil. UN (1955), pp 15-18.
41. This refers to the state where each player takes, as given, the optimal choice of the other player. The market equilibrium requires that each assumes correctly the rules that govern the behavior of the other, which is supposed to bring him the highest possible benefit.

42. Salant (1976), p 1881
43. Ulph & Folie (1980), p 646. This proposition was proved under the assumption of constant marginal cost of extraction, i.e. where the only source of decrease in profit comes from a fall in the rent. No such clear-cut conclusion was possible under the assumption of increasing cost.
44. Kalyman (1975) developed two models with the nearly unique feature of incorporating a direct export demand curve for OPEC oil.
45. Ben-Shahar(1976), p 58.
46. Blitzer, Meeraus & Stoutjesdijk (1975), p 330. The optimality of the oil price reduction is warranted here by discouraging investments in alternative energy resources, and therefore maintaining OPEC's share in the market.
47. Cremer & Weitzman (1976), p 164. The static monopoly price was defined as the price resulting from solving the same problem but for a fixed supply from the competitive fringe.
48. Nordhaus (1979), pp 16-20. If the oil extraction cost was close to backstop price, or if the elasticity of the oil price was less than a unit, the monopolist would fix the oil price at the backstop price throughout the life of the reserves.
49. The procedure could not, therefore, produce a "robust set of estimates for the wealth maximizing or limit-price", wrote Nordhaus (1979), p 113. Nordhaus also provided a third type of application of this model aimed at incorporating some of the market imperfections. In our view, however, the use of the model is hampered by the arbitrary assumption of the sum of \$ 13 for OPEC's extraction cost and "export tax" in 1975, thus leaving some 20 cents to cover the scarcity rental, which would leave as high as \$ 10 scarcity rental for US oil.
50. Actually, Blitzer et.al. (1975) considered in a later stage in their model the possibility of the existence of an interest conflict within OPEC. One of the ways to resolve this, they argued, would be to find a country or group of countries that would be able and willing to assume the role of price leader in OPEC. Other OPEC countries would then behave as price takers, in the same manner as firms in the competitive fringe.
51. Hnyiliczka & Pindyck (1976), p 145. This is based on the "Nash cooperative" game theory, where the frontier of the optimal solution is proportional to the locus of the "threat point", i.e. the point that represents the outcome of the situation of no agreement. In this particular example, the threat point is represented by the condition that would prevail under conditions of perfect competition.
52. Cf Fischer et.al. (1975) where a number of models of the world oil markets were reviewed critically and compared.
53. The study of Solow (1974b) is a remarkable exception, in that it combined the extraction from the exhaustible resources and the investment in the reproducible assets, in order to acquire some form of intergenerational justice. No attempt to introduce any limit on investment was made, however.

7 A MODEL FOR SIMULTANEOUS DETERMINATION OF OIL PRODUCTION AND INVESTMENT PROGRAMS

INTRODUCTION

In order to avoid the complications connected with determining the oil price and output time-paths in an optimal manner as presented in the previous chapter, some economists preferred to take them as being exogenous variables rather than endogeneously determined from within the model. In these models, attention is directed towards allocating a certain given amount of oil revenue for various uses during a specific time period. The present chapter will review one such model. We are hoping to demonstrate that whether oil revenues are determined in a pure optimization manner or are taken simply as given, the end will be somewhat the same with respect to allocation and will also reflect similar shortcomings.

Our central proposition will then be introduced. A simplified model will be presented in order to illustrate the proposition and to demonstrate the possibility of its application. The novelty of the model is its ability to treat the oil production program as an endogeneous variable, determined from within a macro-economic model and in accordance with the actual requirements of the economy for oil revenue. It is not, however, our claim that we can produce a schedule of oil extraction rates through time, against which the actual production rates can be compared. This is not our intention, even if the, indeed very poor, quality of the available data would allow the attempt. Our interest lies primarily in two points: to show the possibility of reaching a level of oil extraction and export that is compatible with the internal requirements of the economy rather than vice versa; and to follow up the implications of the limited absorption and the necessity of easing the dependency of the economy on income from the oil sector. The application of the model, as presented here, does not tell us how much oil the Iraqi should produce, but rather suggests a method of analysis and indicates which form the solution may take.

In his evaluation of the optimal control technique in the formation of macro-economic policy, Johansen (1976) concluded that: "Under limitations and constraints which we have to face in reality, we may have a trade-off between, on the one hand, the breadth and richness of the model as a des-

cription of the real economic mechanisms and its capacity to absorb and utilize relevant information and, on the other hand, the degree of sophistication in the optimization".¹ He recommended the use of less sophisticated optimization in favor of a more detailed description of the economic mechanism. Our model presented in this chapter runs along the same lines. But, although it is relatively disaggregated and detailed, it has still been simplified both as to linearity and to lag structure.

The chapter is divided into five sections. We begin with a critical review of a model that demonstrates the allocation of an exogenously determined amount of oil revenue. The general background and framework of our own model will then be introduced. A few words concerning the data and the estimation of the coefficient will be followed by a general analysis of the primary numerical results deduced from solving the model. Some ideas concerning the generalizability of the model will be presented on occasion. In as peculiar a market as that of crude oil, it is difficult to suggest any oil production strategy for a single oil exporting country without following up its implications for OPEC as a whole.

7.1 ALLOCATION OF AN EXOGENOUSLY DETERMINED OIL REVENUE ,A CRITIQUE

As we have noted in the previous chapter, if the oil production time-path is determined independently of the local internal requirements of the economy for oil revenue, the allocation of this revenue will require the existence of an external outlet capable of absorbing all that was not invested or consumed internally. This observation is quite likely true whether the oil output time path has been determined in a pure optimization manner or has been determined arbitrarily. It is in fact quite possible to consider the allocation of an exogenously determined oil revenue as being a second-stage model. The first stage would be to determine the oil output time-path in an optimization manner, similar to that presented in the previous chapter.²

The allocation model to be reviewed here is elegant, sophisticated and representative. It was designed to "examine the possible investment strategies open to an oil-producing country". It was constructed by H. Motamen and presented in her recent book: Expenditure of Oil Revenues - An Optimal Control Application to the Iranian Economy. For a given lifetime of the oil reserve, the Motamen model aims towards clarifying how the reserve can be transformed such that when it is finally depleted, it will be replaced by an alternative source of revenue.

To that end a macro three-sector Keynesian type model was first constructed. The three sectors were oil, the non-oil internal sector and the external sector. The definitions and relations of the model were based on a set of assumptions, the most important of which were the following: 1) that there is a labor supply curve that is perfectly elastic; 2) that oil export and the return on investments abroad are the only sources of foreign exchange earnings (this assumption was later dropped when a fourth sector, the non-oil export sector, was introduced into the model); 3) that private consumption is a function of the non-oil income flow; 4) that the surplus - or deficit - in the balance of payments is equal to the investment - or withdrawal of investment - abroad; 5) that local investments are allocated among various internal sectors in an optimal manner determined by the prevailing demand pattern; and finally, 6) that the oil net price, optimal extraction rate, size of reserves and the public consumption are exogenously determined variables.

The criterion or objective function was the maximization of the non-oil local capital stock. This was subject to two constraints: 1) that the country should have no external debts in the terminal year, i.e. the country's foreign portfolio should be non-negative in the year when the oil is finally exhausted; 2) that a minimum level of imports is required in each time period.

The minimum level of imports was quantified by assuming that certain shares of both the non-oil income flow and the internal investments are spent on imports. This condition imposes a certain limit on the size of surplus that can be invested abroad during each period, since that surplus is necessarily less than the country's total earning of foreign exchange.

The problem consists, therefore, of an objective function subject to two constraints and of a macro intertemporal model which incorporates eight definitions and relationships with eleven variables - two of which are exogenous - for each period.

When the optimization problem is solved subject to the first condition only (i.e. no final debt), a familiar conclusion is reached: "Invest internally or externally wherever a higher return is offered. At the margin the two should be equal"³. The solution suggests implicitly that once the country approaches the terminal year, all that has been invested abroad should be brought back to the country and deployed productively. When the second condition (i.e. minimum import) is introduced as well, the outline of the solution depends on whether or not the minimum import requirement con-

straint is binding. If it is binding, allocation of investments should favor the external investment, demanding a relatively higher return on investments at home, i.e. investments abroad should be made at lower returns than can be secured internally. If the minimum import constraint is not binding, then investments should be allocated in such a way as to make the marginal return on local investments equal or lower than that on investments abroad.

In her third chapter, Motamen extended the model to incorporate a fourth sector: a non-oil export sector. The macro-economic model and the minimum import constraint were adjusted so as to include a fixed import share in the non-oil export sector, in addition to the minimum fixed import share in the non-oil income flow and the non-oil investment. The outline of the solution here confirms the results deduced from the three-sector model.

Based on the intuitive observation that import will be more binding during the early period of the life of the resource than during the later, Motamen concluded: "The solutions continue to advocate larger volume of investment at a lower rate of return overseas during the earlier part of the resource life. Similarly, they call for the expansion of the domestic sector towards the end of the life of oil by asking for lower yield on investment at home."⁴

Motamen then applied the three-sector version of her model empirically on the Iranian economy. Assuming that the final exhaustion of oil would occur in 1995, that a non-linear decreasing return to scale production function for non-oil revenue and for revenue from foreign investment exists, assuming further that the parameter of the latter function is determined in such a way as to ensure an average return on investment abroad of 8%, and finally, by assigning certain appropriate values for the various parameters in the model as well as for the two exogeneous variables, the model becomes ready for iterations. That is, it can produce values for the objective functions for various control strategies concerning the control variable: investment. The maximum solution was deduced after 50 iterations. By 1995, investment abroad was put at one unit.

When Motamen compared her optimal solution with actual policy in Iran during 1971 to 1978, she found that actual non-oil domestic investment followed very closely the time-path of the oil revenue. And while the actual non-oil domestic investment was lower than the optimal one in the initial period 1971 - 1974, it was almost three times higher in the latter period between 1975 - 1978. I.e. actual domestic investment should have been lower, for-

eign investment should have been higher and the balance of payment surplus should have been four times higher than what actually occurred during the period from 1975 to 1978. The numerical exercises also supported the central proposition of the study: "Iran should have ignored the jump in revenue and continued along its growth path and placed its oil receipts abroad. The country pursued in fact exactly the reversed policy."⁵

The critical points presented below concerning the Motamen model refer to the methodology she applied rather than to the specific assumptions imposed for the sake of the model's empirical application.

The basic argument in Motamen's model meets with some confirmation. We are given a certain flow of foreign exchange and certain import requirements for local consumption and investment. Investment abroad can generate additional foreign exchange in the form of interest, while investment at home can increase the criterion function. The question is how to allocate investment between the two markets so that at the terminal year, home investment will be at maximum and the country's investment abroad non-negative. In such a setting, it is the import requirement that determines how much investment should be executed at home. The more imports are binding, the more investment should be made abroad in order to benefit, at a later stage, from the interest they will yield. Since the import requirements are taken as constant shares, it seems trivial to solve the model without introducing the non-oil export sector. In this case the last year in the planned horizon will indeed be the "day of judgement". Although the economy will have maximum capital stock, it will have no more oil and no more foreign investment, but will still be in need of imports in order to produce and consume. Once the non-oil export sector is included, much will depend on the particular type of internal investment policy and the priorities that are adopted by the country concerned. Understandably, this consideration falls outside of the Motamen model. However, the implied correlation between the absorptive capacity of an economy and the state of its balance of payments seems quite unjustified. There is hardly any reason for assuming that all that can be imported in accordance with the balance of payments conditions can be utilized efficiently and productively by the underdeveloped oil countries.

It was suggested by Motamen that although the argument of the objective function was the stock of non-oil capital, the flow of non-oil income or the consumption variable could also be used equivalently. This possibility is not, however, without its price and it, in fact, imposes certain con-

straints on the functional relations in the model. For, the flow of non-oil income should then exclude the revenues that are generated from investment abroad. Also, consumption ought to be related to the domestic non-oil income only. The possibility of directly consuming a share of the oil revenue should then be excluded. Therefore, if consumption was the argument of the objective function, the revenues received from investment abroad should not be allowed to have any direct effect on the consumption. Otherwise, a pure profit-maximization result will be deduced.⁶

It is interesting to note that the minimum import requirement condition is necessary in order to arrive at a somewhat meaningful solution in the Motamen model. In the absence of that condition, the model calls for allocating investment between the external and the internal markets in such a way that the marginal return on both of them will be equal. This profit-maximizing solution is trivial if one uses an objective function with local capital stock as an argument, for it is of "bang-bang" nature: i.e. it implies that all investment abroad will be brought home once the terminal year is reached. Generally, therefore, whenever the import requirement condition becomes non-binding, investment will be allocated between the two markets in accordance with their marginal returns. This is based of course on the fact that more revenue will then be available for investment at home once the terminal year approaches. Motamen seems therefore to have adopted a profit-maximization approach qualified by the permanent requirement for import. Motamen herself, however, noted that the profit-maximization principle is "not the real objective for the OPEC members, as it is mistakenly assumed by some economists..."⁷

Although Motamen realized the importance of political considerations in deciding how much oil will be exported, she failed to see their effects on the foreign portfolio. Investment abroad may not prove to be so mobile as the solution seems to require, nor can one assume that the world market will readily receive and return any amount of funds, at any period of time and at a relatively high return. It is also assumed implicitly that hardly any effect, other than bringing about an appreciable interest, will result from the accumulation of funds abroad.⁸ This treatment fails to take into account the view expressed and held by many oil exporters that their portfolio abroad is exposed constantly to devaluation, inflation, expropriation and other socio-political pressures. Also, it does not recognize the direct internal political impact of keeping large portfolios abroad while certain serious shortages are experienced at home, even if they cannot all be solved

by providing more funds. Furthermore, the actual historical experience of all of the oil countries has shown that the so-called "rentier-mentality" which has proved to have an extremely dangerous impact on any meaningful development effort, is aggravated even further by the accumulation of a foreign portfolio. To some of these important issues we shall return in the following chapter.

7.2 A MODEL FOR AN OIL PRODUCTION PROGRAM, THE FRAMEWORK

In the light of our knowledge of the basic characteristics and bottlenecks of the Iraqi economy, we shall now attempt to draw together some of the basic ideas contained in the theoretical parts of our investigation. It is hoped that this will provide a justification for the proposition and serve as a background for some of the assumptions we are introducing in the model.

The determination of optimal oil prices and the corresponding optimal extraction time-paths in the manner suggested by the pure exhaustable resource theory has serious shortcomings and seems to be of limited practical significance. Yet economists have attempted to use certain aspects of the theory in order to make a number of observations regarding the international oil markets. The rules that govern the behavior of both the monopoly and the perfectly competitive firms are joined in one model. In such an approach, OPEC is treated as a unified single monopoly body, while the non-OPEC oil producers are grouped together as the "competitive fringe". Furthermore, the optimal oil prices and extraction programs are determined on the basis of maximizing the net gain of both parties.

It was argued earlier in the study that it is highly doubtful whether OPEC represents a true unified body or whether the true aim of each of the countries is to maximize its own total net gain from the oil reserves. These models put the stress on the institutional nature of the market rather than on the peculiar state of the crude oil resource: crude oil is a commodity available in OPEC's stores in larger quantities than in the stores of its competitors. The problem for OPEC therefore is to observe the quantities that the competitors are going to put on the market in relation to the different oil prices, and then to fix a price that will maximize its profit from supplying the unsatisfied demand. This is the familiar Marshallian problem of short or medium supply-demand relations, which emphasizes capturing the temporary inflexible state of supply. It seems to ignore the fact that

oil producers may not worry about the somewhat long-run effects of either expansion of the productive capacity of the competitors or the shift of demand towards other substitutes.

The determination of the oil production levels in order to maximize the profit, or any other similar criteria independent of the internal structural setting of the economy, will tend to suggest an oil production program that does not correspond to the specific needs and specific economic goals set forward by the individual oil producing country. Considering the general present conditions, such an approach will call for oil production programs that will provide the producing countries with far larger amounts of funds than what can be absorbed productively in their local economies. The allocation of these revenues will, therefore, either enlarge the various forms of throw-away spending and/or require the existence of an external sector that would be able to absorb all the oil revenues that could not, or would not, be used internally.

The latter choice is recommended by a number of economists. To invest externally what cannot be used in a productive manner internally is certainly better than to squander all the oil revenues. But this choice may still turn out to be a second best. Actually, this approach does not pay due attention to the risk factors associated with investment abroad, nor to the tendencies to squander provoked by the accumulation of foreign portfolio and the general availability of funds in excess to what is required to fulfill internal needs and the goals of general development. This type of consequence will be dealt with later in the study. For the time being, however, it seems to be sufficient to stress that crude oil possesses a particular nature derived from several factors. For example, crude oil is highly competitive with respect to price and quality with any other known or probable future source of energy, it cannot be substituted as an input in the vital petrochemical industries, and it is in a strictly limited total supply which is largely controlled by OPEC.

As can be seen from the above discussion, what seems to be missing is an analysis of an oil production program for the individual OPEC members, based on their individual "internal needs" that are primarily governed by their varying capability to undertake productive investment, by the potential of their economies and by their ability to provide capital resources other than those coming from crude oil export. In this manner, the inflow of oil revenues can be brought under strict government control so as to allow the

stabilization of the economy, the undertaking of meaningful planning in order to achieve the final goals and the minimization of the negative impacts resulting from receiving such "easy" income.

In this respect it is important to realize that for a variety of reasons, the oil-rich underdeveloped countries have a severe limit on their capacity to absorb productive investment. Under such circumstances, a country cannot invest as much as it perhaps wishes to do, even if the necessary funds for financing that amount of investment were available. The failure to realize this point in Iraq, in spite of the chronic failure of the country's development plans to invest all the funds that were allocated to them, was one of the major reasons behind much of the relatively poor performance of the economy. It is in terms of the absorptive capacity concept and the strategic development ends that the internal need for oil revenues may be understood.

One of the obvious elements missing in the conventional treatments is the allocation of the total output that OPEC is supposed to produce among its individual members. In this context, the historical oil production ratios are taken, explicitly or implicitly, as the basis for future allocation. It is true that this reflects only to a certain extent the size of the reserves available to the individual member country. Nevertheless, it is true that this pattern follows the general norms laid down by the international oil companies which used to allocate output in accordance with their various power and property holdings in the various oil concessions.

In the first place, OPEC, as an association of major oil producers, ought to adjust its total oil output in such a way as to acquire and preserve a price which it considers to be "fair" and "possible". Judging by the actual performance of the oil market in the last decade, there seems to be little doubt that oil prices are influenced by political factors as well as, if not more than, economic factors. At every point in time, it seems as if the price level of oil determined by OPEC was related to the power relations on the international scene as well as to the general economic conditions prevailing on the world markets. OPEC's production program should aim primarily at preserving this price level by regulating the size of its total output.

The proposition here is that it would be advisable that each member country in OPEC determine its oil production program on the basis of its actual ability to absorb oil revenues. This idea can be generalized so that, on the

one hand, it could help each individual country to determine the amount of oil export it requires on the basis of its internal need and, on the other hand, could serve as a tool, along with other indices, for allocating a specific volume of oil output among the various OPEC members. There is little reason to suppose, however, that for any given oil price, the sum of the required output in each of the OPEC countries will match with the amount of oil demanded at that particular price. The gap between the two amounts may be to the advantage of OPEC, i.e. the world demand on OPEC oil at a given price is larger than what the OPEC members need to produce on the basis of their internal requirements. Or it may be to their disadvantage. In both cases the required increases or cutbacks in oil output can be allocated among the various members in accordance with some criterion: the size of the reserve, of the production facilities or the percentage of current oil production.⁹ This point will be discussed in some detail later in the study. (See section 8.2.)

Our prime interest here, however, is to demonstrate the way in which oil output can be determined from within a macro-economic model in a single oil exporting country, Iraq.

7.3 THE STRUCTURE OF THE MODEL

This is an intertemporal, multisectoral linear programming model which aims at determining the size of oil output based on the oil revenues requirement and subject to a number of constraints. The constraints imply the easing of ten dependency of the economy on the crude oil sector, thus reducing its one-sided character.

The similarity between oil rent and external aid and foreign grants has been noted for some time.¹⁰ In particular, the oil revenues received by the producing countries have very little to do with the production processes in the countries concerned, and there exists an obvious isolation between the oil extraction sector and the rest of the local economy. The fact that the dependency of the oil countries on the oil sector is confined only to the expenditure side rather than the inter-industrial correlations, means that the Middle Eastern oil industry cannot be considered a "leading sector" with all the usual economic implications. In fact, the basic role of the oil rent collected by the oil exporting countries resembles the role which external resources play in the aid-receiving countries: it permits the economy to "grow at the limit corresponding to its ability to increase its capital

stock rather than at the lower rate implied by its ability to increase domestic savings".¹¹ It may not be surprising that the seminal material for the model presented here is found in the Chenery and MacEwan study: Optimal Patterns of Growth and Aid - the Case of Pakistan, (1966). Our model also draws upon the general approach and methodology used by Ezzati (1976).

In the present model, the economy is divided between oil and non-oil sectors on the one hand, and between private and governmental sectors on the other. In as far as investment is concerned, two basic features should be born in mind: 1) The model confines itself to a rather aggregate approach with respect to internal investment. It does not touch upon the important questions concerning the sectoral allocation and investment policy carried out internally by the country concerned, but stresses only the absolute bound imposed on its overall size.¹² 2) The model disregards the possibility of investing any share of the oil revenues abroad. This point will be discussed further later in the chapter.

7.3.1 THE OBJECTIVE FUNCTION

The aim is to maximize an expression consisting of the present value of private consumption over the planned horizon and the weighted non-oil value added in the first year after the plan:

$$\max. \quad W = \sum_{t=1}^T \frac{PC_t}{(1+i)^t} + J \cdot NA_{T+1} \quad 1.$$

$$\text{where } J = (1-g) \cdot \sum_{p=1}^P (1+w)^p \cdot \frac{1}{(1+r)^{T+p}}$$

The second term in the function represents a terminal condition to assure the availability of non-oil resources for the post-plan period. All the variables and parameters used in the model, including the formula above, are listed in the following:

Variables

QD	Quantity of domestic oil demand
NR	Non-oil revenues received by government
NA	Non-oil value added
TI	Total investment
GIN	Government investment from non-oil revenues
GIO	Government investment from oil revenues
QT	Quantity of oil output
PC	Private consumption
NX	Non-oil export
TM	Total import
OX	Oil export
GR	Government revenues
OA	Oil value added
DI	Disposable private income
PI	Private investment
FI	Factor income to abroad from oil sector
GC	Government consumption
TR	Transfer payment from oil revenues to DI

Parameters

i	Discount rate during the planned period
r	Discount rate during the post-planned period
J	Weight on terminal year non-oil value added
w	Post-plan sustained growth rate
T	The plan's time horizon: $t = 1, 2, \dots, T$
p	The post-plan time horizon: $p = 1, 2, \dots, P$
g	Average propensity to invest from non-oil value added
k	OPEC net take per each extracted oil barrel
c	Total cost of extracting and exporting an oil barrel
n	The internally retained share from c
e	Incremental output/capital ratio
m	Absorptive capacity growth rate
f	Annual growth rate of local demand on oil
u	Marginal propensity to invest from non-oil government revenue
v	Marginal propensity to invest from disposable income
y	Minimum growth rate of private consumption
q	Index number for dependency on oil, for OA_0/NA_0 , $q = 1$
h	Index number for dependency on oil, for TR_0/DI_0 , $h = 1$
s	Shadow price of oil extraction
R	Total available oil reserve in the base year

If oil reserves and, therefore, oil revenues are assumed to vanish by the end of the plan, the second term in the objective function will then represent the discounted value of consumption in all the years after the plan, an indicator of the feasible substantiated growth rate that the economy can attain after T .¹³

For our purposes, however, the weight assigned to the second term may well be considered as being merely a value judgement set forward by the managers of the economy for that end. The function also includes a number of parameters that refer to various welfare assumptions, e.g. time preference. Both Chernery & Mac Ewan (1966) and Ezzati (1976) used total consumption, i.e. private and public rather than private consumption alone as the argument in the objective function. Here we prefer to use private consumption alone in order to draw a strict line between the household and the government budgets and to give the government a greater freedom of movement for regulating oil exportation.

7.3.2 THE BEHAVIORAL EQUATIONS

It may be somewhat surprising that we use behavioral equations that imply extending the historical trends in a linear programming model. It was suggested that the linear programming model provides a means for establishing which policies to follow in order to satisfy certain conditions, rather than to take the behavioral equations as givens. The simplified nature of the model, our heavy dependency on the macro-economic relations for the economy concerned, and that we are more interested in the overall inter-relation between the oil and non-oil sectors via the flow of oil funds, justifies the extension of the historical trend for some of the variables into the near future.

The domestic demand on oil in the oil producing and exporting countries has often been ignored. This demand has been increasing at a very high rate in the past decade and is expected to represent a noticeable proportion of the total produced oil in these countries in the future. We propose that the quantity of the domestic oil demand will increase at a certain exogenous growth rate from one year to another:

$$QD_t = (1 + f) QD_{t-1} \quad 2.$$

The non-oil revenues received by the government consist of three major components: indirect taxes, direct taxes and return on the government's various productive activities. The last component is important in the oil producing countries. The oil governments, being the collectors of oil revenues, were put at the center of economic activity and could not escape undertaking or at least participating substantially in various development and productive projects, especially in the industrial field. The indirect taxes, as often

quoted in the development models, can be treated as a function of imports, while the direct ones are referred to as a function of the gross national product. For the sake of simplicity, we will treat the non-oil government revenues as an aggregate variable and introduce it as a function of the previous year's non-oil value added, as well as of government investment undertaken in the previous year consisting of investment financed by oil and non-oil revenues:

$$NR_t = a_3 + b_3 (NA)_{t-1} + b_3' (GIN + GIO)_{t-1} \quad 3.$$

Alternatively, government non-oil revenues could be made a function of the previous year's non-oil value added only. This is justified by the fact that investment, including that of the government, results in increasing the non-oil value added, although it takes place after some time lag.

The model makes use of a rather simple production function which relates the present year's growth in the non-oil value added to the total investment undertaken in the previous year via the output/capital ratio.

$$NA_t = NA_{t-1} + e \cdot (TI)_{t-1} \quad 4.$$

The function is confined to the non-oil value added rather than to the total national product, i.e. non-oil and oil values added. In this way the two sections of the economy can be identified more clearly and the concept of the limited absorptive capacity can be confined to non-oil investments. The absolute bound on the size of investment that can be undertaken in any year may reflect the impact of a variety of factors on the production process, including shortages of skilled labor. Investment in the oil extraction and export facilities is treated implicitly in the model because it is considered as being a part of the oil production cost which will be presented later. Furthermore, the production function equation demonstrates our disregard of the depreciation in the economy and the necessary investments for replacement annually. Since this factor is taken often as a constant, and since the investment structure is not our primary concern here, this simplifying assumption should not disturb our investigation.

Another simple functional relation is applied to account for the non-oil export:

$$NX_t = a_5 + b_5 \cdot (NA_t) \quad 5.$$

It may seem strange that export is made a function of an internal variable i.e. the non-oil value added, rather than of other variables related to the state of the external markets. Actually, the relations with the world market are incorporated in that function but in an indirect manner. The growth of the non-oil value added depends on the investment executed in the previous year and the largest share of this investment is financed by oil exports. This in turn reflects the general economic state in the oil importing countries and the world markets at large. It should be noted also, that the functional relation between the non-oil value added and non-oil exports depends on the specific investment policy and pattern adopted by the country concerned, for example, if it favors the export-oriented industries and to what extent. At the present time, however, the non-oil export of the major oil exporting countries is negligible and where such export exists, it consist mainly of non-manufactured goods.

In the terminology of our model, government investment consists of two components: government investment from non-oil revenues and from oil revenues. To calculate the former, we will utilize a parameter of the government marginal propensity to invest from non-oil revenues:

$$GIN_t = GIN_{t-1} + u \cdot (NR_t - NR_{t-1}) \quad 6.$$

The equation states that government investment from non-oil revenues in any year equals the amount GIN in the previous year plus the increase in the NR times the marginal propensity to invest from non-oil revenues. Although we are aware of the claim cited by the officials that they do not stamp the origin of the money on the coins once they enter the government budget pool, and that it therefore would be impossible for them to know "what money goes where", this division is quite useful if only to allow the estimation of non-oil revenues that the government can mobilize for investment purposes.

The private investment will be treated in a similar way as the above GIN equation, with the replacement of non-oil revenues by the private disposable income.

$$PI_t = PI_{t-1} + v \cdot (DI_t - DI_{t-1}) \quad 7.$$

The increases in private investment from one year to another equal the increases in the disposable personal income multiplied by the marginal propensity to invest in the private sector.

Total imports play a critical role in the oil exporting countries. The availability of foreign exchange allowed an astonishing increase in the import of consumer goods as well as of services and intermediate goods, resulting in a rarely seen boom in certain activities. Most experts expect this trend to slow down, but this does not alter the fact that large shares of private consumption and an even larger share of the total investment (government and private) will have to be imported from abroad for some time to come.

$$TM_t = a_8 + b_8 (PC_t) + b_8^i (TI_t) \quad 8.$$

It is assumed in the model that government consumption does not require the importation of goods or services. As mentioned earlier in connection with the functional relation between non-oil export and non-oil value added, the imported shares of private consumption and investment depend to some extent on the type of investment policy and priorities adopted by the country concerned.

7.3.3 THE DEFINITIONAL EQUATIONS

The total quantity of oil produced annually equals the sum of the quantity demanded in the local market plus the quantity of oil exported. The latter is presented as the value of oil exported divided by the price of oil per barrel.

$$QT_t = QD_t + \frac{OX_t}{k+c} \quad 9.$$

The price of oil consists of two components: k , the net take of the oil-producing government per barrel, and c which accounts for all the direct and indirect cost involved in extracting and exporting a barrel of oil. It is assumed that oil is sold at a unified price in the domestic and foreign markets.

The total investment consists of three components: the government investment from non-oil revenues and private investment, both of which were defined earlier, and GIO , the share of the oil revenues received by the government and allocated to investment purposes.

$$TI_t = PI_t + GIN_t + GIO_t \quad 10.$$

Government consumption equals its total oil revenues, (i.e. its net take per barren multiplied by the quantity of oil produced) minus the share invested from this oil revenue on the one hand, plus its total non-oil revenues minus the share invested from this non-oil revenue.

$$GC_t = (k \cdot QT_t - GIO_t) + (NR_t - GIN_t) \quad 11.$$

The oil value added consists of two components: the oil revenue received by the government and the share of the oil extraction cost retained in the national economy, n .

$$OA_t = k \cdot QT_t + n \cdot c \cdot QT_t \quad 12.$$

Presented in such manner, the factor income to abroad resulting from oil activities equals $(1-n) c \cdot QT$. The international oil companies are still operating in most of the oil producing countries. In some countries they do not work, on the basis of the oil concession system, but rather on the basis of service contracts, whereby they are paid a fixed charge.

The disposable private income is defined as being the national product (i.e. oil and non-oil values added) net of total government revenues.

$$DI_t = OA_t + NA_t - (k \cdot QT_t + NR_t) \quad 13.$$

Private consumption is simply the disposable income net of the amount allocated for the private investment.

$$PC_t = DI_t - PI_t \quad 14.$$

The balance of payments formula states that oil export plus non-oil export, on the one hand, should match with total import plus the oil factor income paid to non-residents, on the other.

$$OX_t + NX_t = TM_t + (1 - n)c \cdot QT_t \quad 15.$$

The structure of the model, as presented above, reveals two basic features: First, the factor incomes from abroad and to abroad, other than those resulting from oil extraction activities, are in balance and therefore no reference to them was made. This implies that no substantial exportation of capital, i.e. investment abroad, is allowed for in the model. Investment abroad could provide a further outlet for utilizing the oil revenues, and

interest acquired on these investments could thereafter help in increasing the credit side of the balance of payments. Our disregard of this obvious possibility is not based on a strictly theoretical justification that would call for its elimination altogether. However, neither do we think that investment abroad should necessarily be made nor that oil extraction should be put at as high a rate as possible. The following three points may explain our motives: 1) It must be of importance for an oil country to know how much oil it actually "needs" to extract and export in order to stabilize the economy and move toward achieving its long-term goals of diversifying its base and easing its oil dependency. 2) Investment abroad must be subject to government control to some extent. The alarming side effects provoked by accumulating foreign portfolio as well as the increasing awareness of the effects of inflation and expropriation and the various political pressures to which the portfolio are subjected motivated some experts to suggest that only a certain low percentage of oil revenue should be invested abroad, regardless of the return criterion. Such a suggestion can be easily accounted for, once the oil production level warranted by the internal need becomes known. Furthermore, as we argued earlier, there is no reason to assume that the oil output of any OPEC country based on its need will match with what OPEC "wanted" it to produce in order to acquire and preserve a certain oil price. Any surplus earned in this manner may well be invested abroad. Foreign loans may also be used in order to replace any deficit. 3) As we intended to use Iraq as a case study for applying the model, and since Iraq neither has been nor, according to its officials¹⁴ and economic plans, intends to become a country with any sizable foreign portfolio, we have yet another reason for excluding the possibility of producing oil for the sake of investing the resulting revenues abroad.

Second, the model does not allow for the direct private consumption of oil revenues. It is perhaps difficult to justify this feature of the model, especially in the light of actual performance in most of the oil exporting countries. The model is easily modified, however, to account for this possibility. Denoting the transfer payment from oil revenues to the private sector by TR, we rewrite the previous government consumption and disposable income equations as:

$$GC_t = (k \cdot QT_t - GIO_t - TR_t) + (NR_t - GIN_t) \quad 11'.$$

$$DI_t = OA_t + NA_t - (k \cdot QT_t + NR_t) + TR_t \quad 13'.$$

In this setting, the oil received by the government, which equals the government's net take per barrel times the oil quantity produced, can be allocated via three outlets: government investment budget, government current budget, and transfer payment to disposable income. The second alternative of the model will include, therefore, the same relations, with the exception of 11. and 13., which will be replaced by 11' and 13'.

7.3.4 THE POLICY CONSTRAINTS

Usually in linear programming models, the equations of the policy constraints, though essential for getting feasible and meaningful solutions, are not a part of the structure of the model. They supplement the objective function by bringing into the picture the general aims that are set forward, or should be set forward, by the policy-makers. The model presents four different types of policy constraints. The first two refer to absolute targets concerning total investment and private consumption. The other two constraints refer to the dependency of the economy on the oil sector, to which we will return below.

The limit on the ability of an underdeveloped country to absorb investment has been discussed earlier (Cf chapter 5) in some detail. It may be recalled that absorptive capacity was defined as being the amount of output increment that the society can manipulate at any given time, and that this ability is governed by several factors, not all of which are based on strict economic realism. It was further argued that this ability may, with some approximation, be incorporated in the model by placing an upper limit (m) on the growth rate of the total investment.¹⁵

$$TI_t \leq (1 + m) TI_{t-1} \quad 16.$$

It may also be desirable not to allow private consumption to decline or even to stagnate. Such a policy constraint is more important in the oil-rich countries than in other underdeveloped countries, for the expectations of the population in the former are much higher and apparently more warranted. This constraint can be formalized in a similar manner to the previous one:

$$PC_t \geq (1 + y) PC_{t-1} \quad 17.$$

The other two constraints referred to above concern the dependency of the economy on the oil sector. Several studies considered the index of this

dependency as being the share of oil export in the total foreign exchange earning. In the present model we select that index as being the share of oil value added in the total national product.

$$\frac{OA_t}{NA_t} \leq q \cdot \frac{OA_0}{NA_0} \quad q \leq 1 \quad 18.$$

The above constraint states that the share of oil value added in the national product must be less than or equal to its share in the base year. q is an index number for the required decline in dependency. The constraint may be applied from one year to another, or only at a certain point in the planned horizon.

If the second version of the model is used, a similar constraint referring to the share of the transferred payment in the disposable personal income can also be introduced.¹⁶

$$\frac{TR_t}{DI_t} \leq h \cdot \frac{TR_0}{DI_0} \quad h \leq 1 \quad 19.$$

Different values could naturally be assigned to the dependency indices q and h in these constraints in order to follow-up their impact on the various economic indicators in the model.

Finally, a constraint which ensures that the total quantity of oil extracted during the planned horizon does not exceed the total amount of available reserves can be expressed as:

$$\sum_t^T TQ_t \leq R_0 \quad 20.$$

This constraint will hardly be binding considering the relatively short period of time we are dealing with and the relatively large reserves available for the major OPEC producers. The constraint will not, therefore, be introduced in the solution, a factor which stresses the short or medium-run nature of the model.

7.4 THE DATA

The first question that faces us here is related to the parameters of the model. It is clear that these parameters could, and actually should, vary over time. This variation is even more important as we are demanding and expecting a structural change in the economy concerned, rather than a mere quantitative growth. However, for the sake of simplicity and because a relatively short period of time will be considered, we operate with constant parameters. It is possible nevertheless to apply a wide range of sensitivity analyses on these parameters such as to follow-up the effects of assigning various values to them. Once again, we should stress that our prime interest is in the general approach presented, rather than in the resulting solution.

The second question concerns the estimation of the parameters in the behavior relations. The ordinary least square method has been applied on data for the period 1960 to 1975, in order to estimate these parameters. Certain modifications were required, however, and made on these historical trends in order to account for the drastic changes that occurred after the revolutions in oil price in the mid 1970's.¹⁷

Two basic prices for oil are considered in the model. These are \$ 9 and \$ 13 (i.e. ID 3 and ID 4.33 respectively). If 1974 is taken as a base year, these prices correspond to \$ 20.8 and \$ 30.1 in 1980, once a 15% annual inflationary rate is accounted for. The net government take is put at 90% of the first price, i.e. ID 2.7, and 75% of the second price, i.e. ID 3.46. The remaining shares go to extraction and exportation cost. This cost is split between retained internally and paid to non-residents. The retained share of the former cost is 30% while it is 25% for the latter.¹⁸

The discount rate during the plan's horizon, i , is often taken in the literature to be around the prevailing interest rate. Ezzati (1976) has used a 10% rate, but a discount rate of 8% seems more plausible and is frequently used, since it is around the market interest rate.

We will not elaborate on the specific values assigned to the parameters that determine the value of the weight on the terminal year's non-oil value added in the objective function J . This is not only because we are excluding the possibility of exhausting all the oil reserves during the plan, but also because there seems to be hardly any reliable information to guide us in this respect. Naturally, the value of J will vary with the length of both the

plan and the post-plan time horizon. Two different values are assigned to J in our treatment, 2.64 and 2.02.¹⁹ Chernery & Mac Ewan (1966) put that weight as 3.4 in the case of Pakistan. Reference will be made later in the chapter, however, to the effect of changing this weight.

The annual growth rate of the local demand for oil in the oil countries is very high indeed. Al Wattari (1980) expected it to be 13% in the early 1980's. Al-Mashtah (1977) and the actual available data for Iraq seem to suggest, however, a rate of 10%.²⁰

The incremental output/capital ratio is taken to be 30%, which is somewhat in line with the estimate presented in the Iraqi development plans. A 5% minimum growth rate for private consumption is also about what the Iraqi economy was achieving in the late 1960's, prior to the oil price revolution.²¹

The marginal propensities to invest from non-oil government revenue and private disposable income u and v are very low as can be calculated, with some approximation, from the official Iraqi statistics.²² The former is practically nil, while the latter is less than 7%. However, since we consider these parameters to be subject to a certain degree of control, u is given a value of 15%, while v is given two different values, 15 and 20%.

The difficulties of giving an estimate to the absorptive capacity limit, m , are obvious. This parameter can neither be expected to be constant through time, nor can it be estimated in the light of the actual performance of the Iraqi economy. Two different values are elaborated upon in this respect, 20 and 25%. These values are perhaps too optimistic, especially if a medium or long time horizon is considered.

The values assigned to the two dependency indices, h and q , will be presented later in the text.

The intertemporal nature of the model requires that it be supplied with initial starting values for a number of variables. The initial values are also necessary in order to evaluate the values of the dependency indices in the base year, introduced in some of the policy constraints in the model. It is important to note that, as usual in these types of models, the initial values ought to be consistent with the relations incorporated in the model. Therefore, only some of the initial variables can acquire actual values, while the rest of the initial values will be calculated from within the model and will not necessarily match with the actual ones.

The following Table presents two different sets of values for the parameters and initial variables utilized for solving the two versions of the model. Both scenarios refer to 1974, and while the initial values in the first scenario are in 1969 constant prices, the 1974 prices are used for the initial values in the second scenario.

Table 7.1 Estimated Values of Parameters and Coefficients

	Scenario I	Scenario II		Scenario I	Scenario II
i	8%	8%	$\tilde{b}_8$	60%	70%
j	2.64	2.02	k	3.46 ID/bbl.	2.7 ID/bbl.
f	10%	10%	c	.86 ID/bbl.	.3 ID/bbl.
a_3	-30.5	0	n	25%	30%
b_3	22%	30%	QD_0	30.3 m.bbl/y	45 m.bbl/y
$\tilde{b}_3$	39%	0	NR_0	228 m.ID	301 m.ID
e	30%	30%	NA_0	1046 m.ID	1325 m.ID
a_5	-19.7	0	TI_0	400 m.ID	532 m.ID
b_5	13%	6%	GIN_0	0	0
u	15%	15%	GIO_0	277.6 m.ID	446 m.ID
v	15%	20%	DI_0		1634 m.ID
a_8	50	140	TR_0		570 m.ID
b_8	30%	40%			

7.5 THE PRIMARY SOLUTIONS

The exportation of crude oil, as can be concluded from the structure of the model, fulfills a double function: providing the government with the necessary funds to fill the gap between the possible investment as determined by the absorptive capacity and the non-oil government income and private funds allocated for investment ends ; helping to fill the gap between the necessary imports generated by the total investment and private consumption and the non-oil export. The fact that these two gaps are not necessarily proportional requires the existence of special outlet for oil revenues in order to ensure its fulfilment of the two equilibrium conditions in the investment market and in the foreign trade market. This outlet is found in the government consumption of oil revenues which is assumed not to generate further imports. Thus the larger the government consumption of oil revenues, the larger is the need to export oil in order to acquire a balance in foreign trade, than in order to acquire the balance in the internal investment market, and vice versa.

If the model was solved subject to the limited absorptive capacity constraint only, the solution would, of course, call for a growth in investment as high as that determined by the absorptive capacity. The oil output will increase

substantially in order to finance both the high investment rate and the large import requirement. The solution of the model so far will hardly be affected if the constraint imposing a minimum of reasonable growth rate on private consumption is added. This is because so long as the funds needed to finance investment and import are available, the growth of private consumption over a certain minimum can be secured.²³

Theoretically, a constant economic dependency on crude oil sector (i.e. a constraint OA/NA ratio) requires, among other things, the share of the non-oil government and private investment in the total investment and the share of non-oil export in financing the total import to remain constant.²⁴ If total investment is growing at the ceiling defined by the absorptive capacity, the decline of the dependency requires that the non-oil government investment and the private investment grow at a faster rate than that of the absorptive capacity and that the non-oil export grow at a faster rate than the total import. It is important to note that these two indices are not independent of each other, for the growth in investment affects the growth of non-oil value added, which in turn determines the non-oil export as well as part of the imports. However, if these two conditions are not guaranteed, the decline in the dependency will require undertaking a total investment lower than that warranted by the absorptive capacity. How much lower will depend primarily on the condition of balancing the balance of payments, i.e. on the amount of necessary import generated by investment and consumption, on the one hand, and the oil and non-oil exports on the other.

This is explained by the structure of the model. For, while a strict equilibrium is demanded in the balance of payments, oil revenues received by the government can be lower or higher than the amount needed to finance investment up to the absorptive capacity limit. If these revenues are higher, which implies that oil export is more needed in order to finance import, all the revenues that cannot be invested will be allocated to the government current budget. On the other hand, the system allows the oil revenues received by the government to be lower than the level that would allow the investment to be brought up to the absorptive capacity limit. Investment is only bound from above. However, if the condition of decreasing the dependency on oil is relatively severe, so as to allow the total investment to grow only at a quite modest rate, the constraint on the lower limit of the growth in private consumption may become binding and the model will therefore fail to give a feasible solution.

As an illustration we will attempt to solve the first version of the model (i.e. no transfer payment) with the use of the parameters and initial values presented in scenario I in Table 7.1. With a 20% annual growth in absorptive capacity and a minimum annual 5% growth in private consumption, the model solves for $T = 14$ and generates the following variables' values:

Table 7.2 Numerical Solution for the First Version of the Model
(with absorptive capacity and minimum consumption growth limits,
but without dependency constraints)

t	QD	NR	NA	TI	GIN	GIO
0.	30.30	228.00	1046.00	400.00	.00	277.60
1.	33.33	307.88	1166.00	480.00	11.98	339.11
2.	36.66	362.95	1310.00	576.00	20.24	412.85
3.	40.33	426.61	1482.80	691.20	29.79	501.35
4.	44.36	502.86	1690.16	829.44	41.23	607.55
5.	48.80	594.36	1938.99	995.33	54.95	735.02
6.	53.68	704.17	2237.59	1194.39	71.42	887.99
7.	59.05	835.94	2595.91	1433.27	91.19	1071.57
8.	64.95	994.08	3025.89	1719.92	114.91	1291.89
9.	71.45	1183.85	3541.86	2063.91	143.38	1556.30
10.	78.59	1411.58	4161.04	2476.69	177.54	1873.61
11.	86.45	1684.88	4904.04	2972.03	218.53	2254.41
12.	95.09	2012.84	5795.65	3566.43	267.73	2711.40
13.	104.60	2406.40	6865.58	4279.72	326.76	3259.83
14.	115.06	2878.70	8149.50	5135.67	397.60	3917.97

t	QT	PC	NX	TM	OX
0.	142.14	725.45	116.28	507.63	480.90
1.	157.53	762.29	131.88	566.69	534.09
2.	178.51	841.64	150.60	648.09	609.95
3.	203.47	938.86	173.06	746.38	701.50
4.	232.99	1055.57	200.02	864.33	811.10
5.	267.94	1195.54	232.37	1005.86	942.29
6.	309.34	1363.40	271.19	1175.66	1099.36
7.	358.45	1564.73	317.77	1379.38	1287.44
8.	416.74	1806.20	373.67	1623.82	1512.70
9.	485.99	2095.84	440.74	1917.10	1782.53
10.	568.31	2443.26	521.23	2268.99	2105.79
11.	666.25	2860.00	617.83	2691.22	2493.12
12.	782.83	3359.91	733.73	3197.83	2957.28
13.	921.71	3959.60	872.83	3805.71	3513.57
14.	1087.23	4679.03	1039.73	4535.11	4180.33

t	GR	OA	DI	PI	FI
0.	719.80	521.64	847.85	122.40	89.55
1.	852.93	578.13	891.20	128.90	99.24
2.	980.60	655.14	984.54	142.90	112.46
3.	1130.61	746.73	1098.92	160.06	128.15
4.	1309.00	855.07	1236.23	180.66	146.78
5.	1521.42	983.32	1400.90	205.36	168.80
6.	1774.49	1135.29	1598.39	234.98	194.89
7.	2076.18	1315.51	1835.24	270.51	225.82
8.	2436.00	1529.44	2119.33	313.12	262.55
9.	2865.36	1783.57	2460.07	364.23	306.17
10.	3377.93	2085.69	2868.80	425.54	358.03
11.	3990.09	2445.12	3359.08	499.09	419.73
12.	4721.45	2873.00	3947.21	587.30	493.15
13.	5595.53	3382.68	4652.74	693.13	580.68
14.	6640.53	3990.15	5499.12	820.09	684.96

The absorptive capacity constraints are binding for every year, with values for their corresponding dual variables being as high as 52.3 for TI_1 down to 0.79 for TI_{13} .²⁵ The constraint on the minimum consumption rate is not binding at any year, and therefore the constraint has a zero shadow price throughout the period.

The dependency ratio, OA/NA , increased slightly from 49.9% in (t_0) to 50.7% in (t_6) , but started to decline thereafter gradually and slightly to 48.9% in (t_{14}) . The ratio of oil export to the total import has declined systematically and in a somewhat greater percentage, from 94.7% to 92.2%. These trends were countered by a substantial increase in the share of the oil revenues in the total investment, from 69.4% in (t_0) to 76.3% in (t_{14}) . Actually, while as much as 44% of the oil revenues received by the government in (t_0) represented a surplus allocated for its current budget, this surplus has declined gradually and has almost vanished in (t_{12}) . The oil budgets in the last two years were in deficit, i.e. the oil revenues allocated to investment exceeded the oil revenues received by the government. This implies that the economy's immediate bottleneck is found in the amount of saving that it is able to provide from non-oil resources. Effort should therefore be concentrated on promoting the size of private investment and the GIN in order to ease the heavy burden on oil revenues.

As mentioned earlier, the decline in the oil revenues allocated to the government current budget indicates that an increase in oil export is needed more in order to finance local investment than to pay for imports. In other words, the state of the given parameters show that if the economy is growing at the maximum level permitted by the absorptive capacity, the non-oil export is also growing at a level compatible with the growth of import, but the non-oil government investment and private investment are growing at a lower rate than that of the total investment or absorptive capacity.

The constraint implying a reduction in the dependency on the oil sector will now be introduced in the solution on an annual basis. In the inequality No. (18), q will be set at two values: 95% and 99%. These imply an annual reduction in the OA/NA ratio of about 2% and 0.5% respectively. In both cases, $T = 9$, and the parameters and initial values presented in scenario I in Table 7.1 are used. The numerical solutions are presented in the appendix of the present chapter. Below, however, the trajectories of some of the variables are drawn:

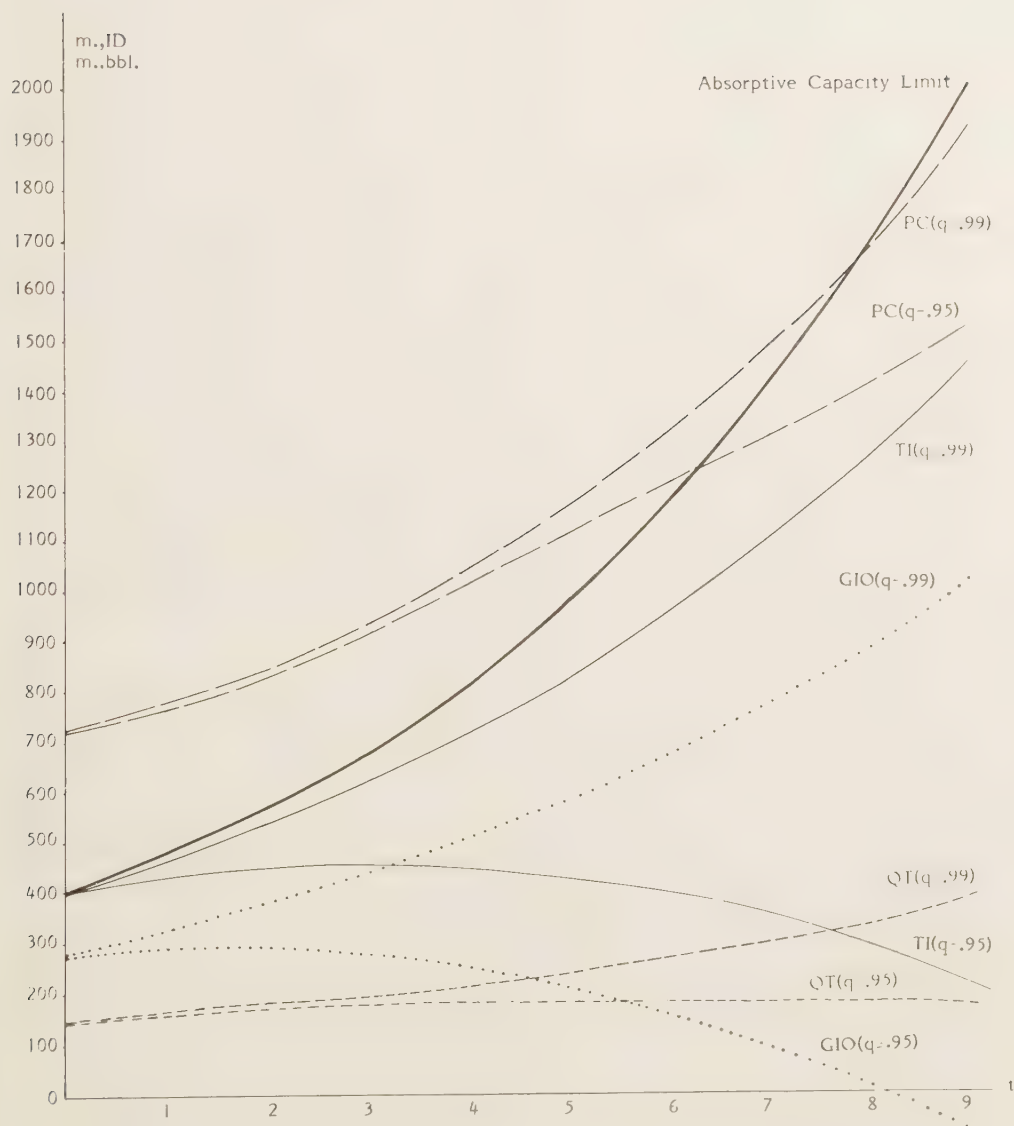


Fig. 7.1 Trajectories of selected variables resulting from solving the first version of the model for two values of q , .99 and .95.

When a 2% annual reduction in the dependency is asked for, the absorptive capacity constraint becomes non-binding, for investment is increasing only in the first two years at a modest rate, and is experiencing an absolute reduction thereafter. This is primarily due to the absolute reduction in the amount of oil revenues allocated to investment ends, which in the 9th year becomes negative. The important thing to note here is that the extremely binding constraint in this case is not the lack of funds for financing the investment. On the contrary, the negative oil investment indicates that what has been allocated for investment from non-oil government revenue and the private sector will generate imports that cannot be counter-balanced by oil and non-oil export. In other words, the lack of foreign exchange is the real binding factor in this case. This can also be seen from the fact that while some 42% of the government's oil revenues is allocated to its current budget in the first year, the ratio becomes 96% in the 8th year.

The negative growth rate in the total investment affects the rest of the economic variables via its effect on the growth rate of the non-oil value added. The last cited year is the final one in which the minimum 5% growth rate in private consumption can be secured. In the 10th year, private consumption can only grow by 4% and the solution becomes unfeasible, i.e. the conditions of reducing the dependency by 2% and ensuring a 5% growth in private consumption cannot be reconciled.

If q is put at 99%, which secures about 0.5% annual reduction in the dependency on the oil sector, the exercise seems to run somewhat smoothly. The dependency coefficient is falling from 49.9% to 45.5% between (t_0) and (t_9) . Private consumption is growing at an accelerating rate, and total investment at a constant rate of some 15%. However, as the government investment, GIN , and private investment can not catch up with the amount of total investment, in spite of the appreciable growth they experience, an increasing share of the government's oil revenues will be allocated for investment ends. This ratio rises from 56% to 75% during the cited years.

A similar trend analysis can also be carried out if the second alternative of the model, which allows for direct private consumption of part of the government's oil revenues, is used. This version of the model was solved for a five-year period with the help of the parameters and initial values presented in scenario II in Table 7.1 In the type of model we are elaborating with, it seems more plausible and perhaps more meaningful to consider a relatively short period of time. The absorptive capacity constraint on the

maximum possible growth rate of investment and the constraint on the minimum growth rate permitted for private consumption are applied for every year. The conditions of reducing the OA/NA and TR/DI ratios are introduced in the 4th year only with q and h set at .96, which implies a certain decrease in dependency between (t_0) and (t_4) . This exercise solves as follows:

Table 7.3 Numerical Solution for the Second Version of the Model

Year	0	1	2	3	4
QD	45.0	49.5	45.5	59.9	65.9
NR	301.0	397.5	445.4	505.2	580.1
NA	1325.0	1484.6	1684.1	1933.5	2245.2
TI	532.0	665.0	831.2	1039.0	1215.7
GIN	0	14.5	21.7	30.6	41.9
GIO	446.0	492.5	605.0	756.8	894.6
QT	454.0	501.5	571.0	650.7	710.5
PC	1548.0	1835.9	2022.2	2210.4	2320.9
NX	69.2	89.1	101.1	116.0	134.7
TM	1140.0	1339.8	1530.7	1751.2	1919.3
OX	1228.2	1356.0	1549.5	1772.4	1932.3
OA	1266.6	1399.2	1593.1	1815.4	1982.3
DI	1634.0	1993.8	2226.7	2462.0	2600.0
PI	86.0	158.0	204.5	251.6	279.2
FI	95.0	105.3	119.9	136.6	149.2
TR	570.0	861.6	936.6	975.2	871.0

The first question that comes to mind here is: since private consumption is what we are maximizing, why then does not the model call for extracting as much oil as there is in the ground during the first three years and direct the resulting revenues to the private consumption via TR? The answer is that although the oil value added is not subject to constraint during the first three years, it is limited in the fourth. If consumption increases too much in the first years by increasing the transferred oil revenues, the fourth year will come and impose a strict reduction on the oil value added and oil export and TR accordingly. PC would become very high in the third year, to the extent that it would be impossible to fulfill the minimum 5% in private consumption along with reducing OA and TR in the fourth year.²⁶ It is reasonable, therefore, that total investment grows at the maximum possible rate of 25% in the first three years. This growth alongside the direct transformed oil revenues secures the growth of private consumption during these three years at a far higher rate than 5%. When the fourth year approaches, however, the oil value added and the transformed oil revenues will be bound from above. In this final year, the transferred payment will be put on its maximum possible level, relative to the disposable income, which in turn will amount to just that level that will secure the least allowed growth rate in consumption. The oil value added is also put on its maximum possible level relative to the non-oil value added. The constraint on OA imposes a certain

limit on OX and consequently on the total possible import. The imported share in the PC will be first satisfied and the remaining will then be allocated to satisfy the very high imported share in total investment. Total investment will therefore be set at a level quite below the allowed level.²⁷

It is also interesting to note that the government oil revenues are allocated in the first two years between GIO and TR exclusively. In the last two years the government current budget is granted ID 25 m. and ID 152 m. from the oil revenues. As mentioned earlier, the reason for not allocating the ID 25 m. in the third year to the TR can be found in the consumption growth and composition requirements in the fourth year. But the reason for not allocating the ID 152 m. or part of it, to the investment in the final year can be found in the fact that no further import is allowed in that year. It should be recalled here that the government current budget is the only outlet for oil revenues which, in our model, does not generate further import. This setting indicates that the lack of foreign currency is still a stronger binding factor than the availability of resources for investment, although the size of the surplus from these resources is declining substantially even in absolute terms.

It is therefore possible to determine the levels of the needed crude oil extraction from within a macro-economic model and to forecast the possible forthcoming bottlenecks along with the vitally important task of decreasing the dependency on the crude oil sector.

The rigid element in our previous treatment appears in the fact that both the timing and the rate at which the dependency is to decline ought to be supplied from outside as a policy decision. This may well be possible in some cases. In other cases, it may be preferable to have these timings and rates as a result of the model itself. The decrease in the dependency constraint, if interpreted broadly, implies that the size of the oil reserve underground is limited and that oil extraction should at some finite time come to an end. It has been demonstrated by Chernery & Mac Ewan (1966) that the foreign aid termination condition can be equivalently and alternatively expressed by assigning a certain price for this aid in the objective function. Here we suggest a similar treatment and assign a shadow price for the amounts of oil extracted annually. The present values of these can then be introduced as negative terms in the objective function;

$$\max W = \sum_t^T \frac{PC_t}{(1+i)^t} - \sum_t^T s \cdot \frac{QT_t}{(1+i)^t} + J \cdot NA_{T+1} \quad 21.$$

In the case of foreign aid, s is taken as the price of foreign capital. In the present case, s is the shadow price for the extraction of crude oil and may be interpreted in a more general manner than the user-cost or the scarcity rental presented in chapter 6 of the present study. It implies a social time preference, expectation of future market conditions and the state and potential of the non-oil resources of the country. It refers as well to the commitment of the political leadership to development and the weight they assign to the negative socio-economic consequences of rent inflow.

If this form of the objective function is applied, the model will in general call for setting QT , the quantity of oil produced, at a level where its positive contribution in increasing the PC_t values and NA_{T+1} outweighs its negative effect as measured by s . As may be recalled, the oil revenues received by the government can, in the second version of our model, be utilized via three outlets; to be invested (GIO), to be transferred to the disposable private income (TR) or to be consumed by the government. The first two outlets will result in certain positive increases in the terms of the objective function, namely the PC_t values and NA_{T+1} . The third outlet will not and, therefore, if the oil revenue resulting from producing a unit of oil is destined for government consumption, it will be presented as a pure deficit in the objective function, and for that reason will not be produced at all.

In the following, the new form of the objective function in conjunction with the second version of our model is used. The constraints on OA and TR are of course ignored now and certain shadow price values for s will be assigned. The model is solved for $T = 4$, and the necessary starting values for the parameters are taken from scenario II in Table 7.1.

Two different values are given to s , 1 and 2. For these two values, the solution matches in the first three years and differs only in the fourth. In both solutions, however, annual government consumption from oil revenues is zero, for the reason that was presented earlier. The oil revenues, therefore are allocated exclusively between GIO and TR .

The results are presented in Table 7.4 below.

Table 7.4 Numerical Solution of the Second Version of the Model with the Modified Form of the Objective Function

t	S=1					S=2
	0	1	2	3	4	4
QD	45	49.5	54.4	59.9	65.9	65.9
NR	301	397.5	445.4	505.2	508.1	580.1
NA	1325	1484.6	1684.1	1933.5	2245.2	2245.2
TI	532	665	831.1	1039	1298.7	477
GIN	0	11.5	12.6	30.6	41.8	41.8
GIO	446	492.5	605	746.6	942.5	0
QT	454	501.5	570.9	656.5	761.9	614.6
PC	1548	1835.8	2022.2	2251.4	2533.8	2944.7
NX	69	89.1	101.1	116	134.7	134.7
TM	1140	1339.8	1530.7	1767.9	2062.7	1651.8
OX	1228	1356	1549.5	1789.8	2088	1646.1
OA	1266	1399.2	1592.8	1831.6	2125.7	1714.7
DI	1634	1993.7	2226.7	2513.2	2866.2	3380
PI	86	157.9	204.5	261.8	332.4	435.2
FI	95	105.3	119.9	137.8	160	129.1
TR	570	861.5	936.6	1025.9	1132.5	1659.4
GCO ⁺	0	0	0	0	0	0

+ GCO is the oil revenues allocated to government current budget

The increase in the oil revenue allocated to investment purposes contributes positively, though in an indirect way, in increasing the two related terms in the objective function, PC_t and NA_{T+1} . If the revenue resulting from producing an extra QT will be allocated to investment, an increase in the PC_t of the next year on the one hand and an increase in the final NA_{T+1} on the other will outweigh the negative effect resulting from producing that unit. Therefore, even for a relatively higher value of s , the solution will call for levels of GIO (and consequently of QT) which will permit the total investment to grow at the maximum possible rate, i.e. at the absorptive capacity rate, in the first three years. When the fourth year approaches, however, investment will contribute in that particular year in increasing the term NA_{T+1} only in as far as the objective function is concerned. Accordingly, GIO will be determined in that year with respect to the weight assigned to NA_{T+1} , i.e. J relative to that assigned to QT, i.e. s .²⁸ As can be seen in the above solutions, GIO is increasing in such a way as to allow the TI values to grow at the maximum rate in the first three years. When $s = 1$, the positive weight on NA_{T+1} is relatively higher, and it is still worth setting GIO at as high a level as possible, i.e. total investment is increasing at the absorptive capacity rate. When $s = 2$, none of the oil revenues are allocated for GIO in the fourth year, for the negative effect resulting from producing a unit of QT outweighs the positive contribution which may result if the revenue from this unit is invested and NA_{T+1} increases accordingly.

The second question concerns the way in which the TR values are determined. It will be recalled that our model does not allow for any surplus or deficit in the foreign exchange earning. The balance of payments condition will, in fact, determine the amount of oil revenues that can be transferred to the disposable income.

After determining GIO, the model will determine TR on as high a level as possible in such a way that the resulting level of private consumption will generate just enough import to bring the balance of payments into strict equilibrium. These two processes of determining GIO and TR will determine, therefore, the amount of oil output that the economy will extract in every year.

CONCLUDING REMARKS

Elegant as some of them are, the models designed to solve for allocating the oil revenues, the size of which were determined at an earlier separate stage, seem to fall short of providing an adequate cure for the oil-based economies. The split between the function of extracting and exporting oil on the one hand, and utilizing the resulting oil revenues on the other, combined with the particular view of some of these models that absorptive capacity is the capacity to re-spend all the earned foreign exchange, seem to take the basic advantage away from the oil economies: their ability to mobilize resources in accordance with their need, rather than to inflate their need in accordance with the revenues they earn. In the more elaborated models such as that of Motamen, however, an external sector is assumed to exist and to be ready to receive all of the oil revenues that could not, or should not, be invested internally for a relatively high return. These foreign portfolio can be brought back later when the internal conditions warrant it. Our investigation here shows that, although such a procedure is superior to the "advice" to squander the oil revenues, it still suffers from serious shortcomings. The risk factors accompanying investment abroad are not fully recognized in her model, nor are the political and socio-cultural consequences that seem to be provoked by the accumulation of foreign portfolio. Furthermore, the limits on the amount of investment that can be undertaken internally (i.e. import requirement), serve more as a necessary condition for allowing the model to avoid arriving at a trivial solution. Such an interpretation of absorptive capacity falls short of incorporating fully all the dimensions of the concept.

One of the most serious problems threatening the strong position held so far by OPEC in the international oil market is found in the absence of a generally acceptable criterion upon which a certain volume of required output of crude oil can be allocated among its various members. During the past decade, although OPEC has been a somewhat aggressive body in as far as oil prices are concerned, it has been quite passive with respect to the quantity of oil produced. This paradoxical situation has been possible only because of specific conditions in the world market and will not, of course, last for long. If only because of the fact that the major oil consumers are now staging a confrontation via their own organization, OPEC will be forced to apply some output regulation formula, if it wishes to acquire and preserve a certain "fair" price for its oil.

The model presented here suggests that the basic requirement for oil revenues in relation to the overall development strategies in the oil producing countries may well be taken as a basis for determining the amount of oil which OPEC "needs" to produce. Supplemented by other weights, this criterion may also be used to allocate the total amount of crude output which OPEC "ought" to produce among its various members.

The justification for determining the oil output level in conjunction with the internal requirements for oil revenue, however, is based more on national economic and social interests than on the interests of the oil cartel. The firm control over the received oil rent seems to be a necessary condition for undertaking a meaningful development planning with the ultimate goal of founding an independent, self-sustained economy at a high level of growth.

The oil revenues received by the exporting countries are essential for filling two different, but certainly interrelated, gaps: that between the internal non-oil resources that can be mobilized for investment purposes and the level of investment that is warranted by the absorptive capacity principle; and the gap between the necessary amount of import generated by certain levels of investment and consumption and the amount of non-oil export that the economy can provide. A certain proportion between the sizes of these two gaps should, via the investment patterns and socio-economic policies, be established in order to gradually reduce the dependency of the economy on the oil sector.

In the conventional treatments, the absorptive capacity is linked to the state of the balance of payments only, and the oil countries are expected to place all the oil revenues that they could not spend

abroad. The present study does not suggest, however, that oil revenues should not, under any circumstances, be invested abroad. It merely suggests that this procedure is not necessarily the only possible one nor the best one. It suggests that OPEC as a whole, as well as its individual members may benefit from taking the internal structure and abilities of their respective economies into account when considering the rate at which they will exploit their oil.

The adoption of a basic oil production program based on the absorptive capacity concept provides the country concerned with a tool for bringing the crude oil sector under some form of control and it is essential for the conscious effort needed to gradually ease the dependency on that sector. The suggested approach exposes the peculiar form of dependency on oil, a dependency which is confined to expenditures only. Consequently, the approach stresses that a reduction in the dependency on the oil sector requires that resources from other non-oil sources should counter-balance the oil revenues.

NOTES

1. Johansen (1976), p 20.
2. The two-stage planning procedure was explicitly adopted by Ben-Shahar (1976).
3. Motamen (1979), pp 14.20.
4. Ibid., p 60.
5. Ibid., p 9. For Motamen this result "clearly shows the roots of the Iranian revolution which lay in poor financial management". The "economic tension" that led to the revolution was a "consequence of an ambitious development policy". Motamen seems to suggest that if the Shah had invested more money abroad than he did, then the revolution would not have taken place or at least its chances of success would have been less.
This is a counter version of the "misery theory". Some ideologists defend poverty because it would give the long-awaited revolution a better chance to succeed. Motamen among other Western strategists, seems to advocate poverty, or at least is opposed to rapid expansion, in order to prevent a revolution.
But as long as the study has not even touched upon the type of investment made internally, her conclusions are meaningless and without basis. Motamen herself noted on p 15 that in Iran "only a small minority enjoy the the high income and consumption". Isn't that a more serious reason for the "economic tension" in the country? The roots of the revolution can be found in the type of economic policy that allows the rich to grow richer at a faster rate than the poor can become less poor, or that force the poor to become even poorer.
Needless to say, the accumulation of Iranian funds in foreign Western countries was one of the most powerful arguments of the opposition in

raising public discontent against the Shah regime. For an analysis of the reasons behind, and the process of, the Iranian revolution, see Walton (1980).

6. If consumption is made function of the inflow of non-oil income, including that generated from investment abroad, allocation of investment between internal and external markets will be determined basically in accordance with the returns. The relation between consumption and investment abroad in Motamen's model is only indirect, i.e. via the need to import a certain minimum share of local consumption.
7. Motamen (1979), p 2.
The equalization between marginal rate of return on investment abroad and investment in the local market was the basic allocation norm applied by Ben-Shahar (1976) to determine the optimal allocation pattern for OPEC oil revenues net of expenditure on consumption and throw-away spending. A simple macro-economic model was constructed for that purpose, taking optimal OPEC oil price and output as givens, having been already determined at an earlier stage in the model (see section 6.4 in this study). Ben-Shahar aimed at determining "the amount of domestic investment (and the resulting rate of growth in the GNP) necessary to provide an 8% marginal rate of return, with foreign investment being treated as a residual carrying the same marginal rate of return". P 80.
8. Motamen did hint, however, at some of these points and presumably thought that an adequate slope for the production function of the investment abroad might take care of them.
9. Ezzati (1976) calls the excess of OPEC needed production over demand at any given price the "destruction gap". The "stability gap" exists when the demand is larger than oil production. Ezzati's model devises production prorating and side-payment schemes to counteract such disintegrative tendencies. P 110.
10. E.g. Mahdavi (1970), pp 229-230.
11. Chenery & Mac Ewan (1970), p 155.
12. Mahdi (1976) developed a linear programming model to point out the growth opportunities for the Iraqi economy once the relative dependency on oil export has been reduced. The economy was divided into 8 indogenous sectors and one exogenous, and the interrelations in input-output manner among these sectors were spelled out. The solution indicated the needed changes in the internal structure of the economy in general, and the non-oil export in particular, to acquire the reduction in the dependency. One of his major conclusions was: "Due to the negative impact of oil revenue growth on the growth of non-oil exports, it seems that the non-oil sector and its exports would have had a more balanced development (and therefore less overall dependency on oil would have ensued) had volumes of oil export been more restrained than they were". (pp 78-79).
13. Chenery & Mac Ewan (1966), p 155. Here, the foreign aid is assumed to be terminated during the period T; the economy will proceed along a path of self-sustaining growth, for a constant portion of income will be consumed. This sustained rate could be calculated by dividing the average (which approaches the marginal) saving rate by the capital/output ratio. It is important to note that since the growth in the non-oil value added depends on the investment in the previous year, the weight in NA was put at

(T+1) in order not to allow the consumption of all the revenues in the year T.

14. See the Iraqi President's view on this point in, e.g. Iskander (1980), pp 192-211.
15. A similar constraint representing a maximum feasible rate of growth of investment was used in Chenery & Mac Ewan (1966). It may be argued that this ought to be included in the structural relations of the model, since it is not fully subject to policy considerations. We choose to present it as a policy constraint, however, in order to stress the fact that this capacity can be to a certain extent affected by the type of investment executed and the general improvement in the socio-political environment prevailing in the country concerned.
16. h and q may well be given values greater than unit, i.e. the dependency on oil is increasing. The important thing, however, is to determine this consciously and for the sake of the overall development strategy.
17. The appropriate equations for the non-oil revenues and non-oil export on the basis of actual Iraqi data during 1960 to 1974 were as follows:

$$NT_t = -30.5 + 0.22(NA_{t-1}) + 0.39(GIN + GIO)_{t-1}$$

(-2.44) (7.45) (1.91)

$$NX_t = -19.7 + 0.13(NA_t)$$

(-1.6) (7.3)

The appropriate equation for TM, the total import, was far from being satisfactory. This was due mainly to the great shift in the data in the mid 1970's. For the period 1960-1972, the equation was:

$$TM = 63.3 + 0.14(PC) + 0.59(TI)$$

(1.1) (0.96) (0.77)

The parameters change drastically when the 1973 and 1974 data are included, e.g. 0.25 (PC). We have chosen to postulate higher values for the coefficients here. The actual performance in the oil countries, including Iraq, seems to warrant that.

18. See the oil price split-up structure between cost and surplus and the distribution of the surplus in 1975 in the Economist, Apr. 26, 1975.
19. These two values are calculated by assigning different values for the parameters in the J equation, as stated below the objective function. However, since we consider this weight to be more of a value judgement, it may not be important to go into the details of the parameter values.
20. Al-Wattari (1980), p 230; Al-Mashtah (1977), p 233 and Arab Directory (1979), p 122.
21. See chapter 4 in the present study.
22. Depending on the Iraqi law which allocated one-half of the oil revenues received by the country to investment, we consider that any investment that exceeds this 50% share is financed from non-oil revenues. With the exception of 1972, government investment was less than half of

the oil revenues it received in each year between 1967 and 1975.

The private disposable income is calculated on the basis of a similar formula as that presented in the model and the investment of the private oil companies is excluded.

The poor quality of the data and the fact that they are collected from many references make the estimate crude. Cf AAS (1973, 1975 and 1976), Hashim (1970), Al-Nasrawi (1967), Maarouf (1977), Al S'ady (1974) and Table 5.1 in the present study.

23. The private consumption in the first year is actually determined by the given total investment in the base year. The minimum 5% growth in private consumption can be guaranteed even if investment were to grow at a far lower rate than 25% and 20%.
24. Also, the share of oil revenue allocated to the government's current budget should remain constant.
25. The shadow price or dual variable corresponding to every constraint in the model indicates, if non-zero, whether the constraint is binding positively or negatively. The value of the dual variable indicates the amount with which the objective function is to increase (or decrease) if the constraint be eased by one unit. The fact that the dual variables for the absorptive capacity constraint were decreasing through time is explained by the constant growth of investment from year to year.
26. This point can be seen clearly if the model was solved with a minimum growth rate of private consumption of 3% rather than 5%. The value of the objective function will in this case increase by some ID 32 m. over the previous solution. All the increase is explained by the increase in the consumption in the third year. Consumption in that year could increase more than before, as it will still be able to increase by 3% in the next year, when the dependency constraints are operating.
27. If the absorptive capacity limitation is reduced from 25% to 20%, the value of the objective function will decline from 12,172 to 11,899. Some 72% of this reduction is explained by the decrease in the value of NA_{T+1} . The rest is explained by the reduction of the private consumption. Actually, with $m = 20\%$, private consumption was higher in the first two years than when $m = 25\%$. This is because, although the oil output was lower, the limited investment possibility allowed the transfer of more oil revenues to private consumption. This trend was countered, however, in the last two years in order to meet the constraint on TR, and the total private consumption in the four years was lower by some ID 105 m.
28. Also with respect to the output/capital ratio relative to the marginal propensity to invest from the disposable income. If the revenue due from an increase by a unit in QT is invested but does not result in a higher increase in $j.(NA_{T+1})$ than in $s/(1+i)$, the unit is not worth being produced for that end. It might be produced, however, if its revenue were to be transferred to the disposable income and would result in a higher increase in PC than s .

APPENDIX

Optimal solution of the first version of the model with different values to the dependency index, q .

t	QD	NR	NA	TI	GIN	GIO	QT	PC
0	30.0	228.0	1046.0	400.0	0	277.6	142.1	725.4
$q=.95$								
1	33.3	307.9	1166.0	436.9	11.9	296.2	150.5	761.0
2	36.7	346.2	1297.1	453.6	17.7	293.0	159.0	841.4
3	40.3	376.0	1433.2	454.3	22.2	273.1	166.0	933.0
4	44.4	399.9	1569.5	453.2	25.8	251.3	173.7	1030.0
5	48.8	422.8	1705.5	436.8	29.2	214.4	179.3	1127.0
6	53.7	439.7	1835.5	406.3	31.7	164.2	183.4	1224.8
7	59.0	449.9	1958.4	361.7	41.9	95.6	185.8	1320.3
8	64.0	453.9	2066.9	307.8	42.5	22.5	186.3	1409.2
9	71.0	449.5	2159.2	228.3	41.8	-70.5	184.9	1491.1
$q=.99$								
1	33.3	307.9	1166.0	474.8	11.9	337.9	156.8	762.3
2	36.7	360.9	1308.4	549.2	19.9	386.5	174.2	841.2
3	40.3	415.8	1473.1	633.1	28.1	445.1	194.2	938.2
4	44.4	478.1	1663.0	728.1	37.4	511.0	217.0	1050.7
5	48.8	549.2	1881.4	838.5	48.1	587.8	243.1	1180.6
6	53.7	631.4	2132.9	964.9	60.4	675.5	272.8	1139.8
7	59.0	725.7	2422.3	1110.9	74.5	777.2	306.7	1501.8
8	64.0	834.5	2755.6	1278.5	90.8	893.6	346.4	1699.7
9	71.0	938.6	3139.1	1462.9	106.4	1019.0	389.6	1944.9
t	NX	TM	OX	OA	DI	PI	FI	GC
0	116.3	507.6	480.9	521.6	847.8	122.4	89.5	442.1
$q=.95$								
1	131.3	540.5	503.9	552.4	889.7	128.7	94.8	520.5
2	148.9	574.6	525.9	583.8	984.3	142.9	100.2	585.6
3	166.6	602.5	540.5	612.8	1092.1	159.0	104.6	655.1
4	184.3	630.9	556.0	637.5	1206.1	176.1	109.4	723.8
5	202.0	650.2	561.1	658.1	1320.3	193.2	112.9	799.6
6	219.0	661.2	557.7	673.2	1435.3	210.4	115.5	878.4
7	234.9	663.1	545.2	681.9	1547.5	227.2	117.0	955.3
8	248.9	657.5	525.9	683.7	1652.1	242.9	117.4	1033.5
9	261.0	634.3	489.8	678.5	1748.5	257.4	116.5	1117.9
$q=.99$								
1	131.3	563.5	531.0	575.6	891.0	128.9	98.8	500.6
2	150.4	631.9	591.2	639.4	984.1	142.8	109.7	557.2
3	171.8	711.3	661.8	712.7	1098.1	159.9	122.3	614.5
4	196.5	802.1	742.3	796.5	1230.5	179.7	136.7	680.5
5	224.9	907.3	835.5	892.1	1383.2	202.6	153.1	754.4
6	257.6	1027.8	942.1	1001.2	1558.8	228.9	171.9	839.4
7	295.2	1167.1	1065.1	1125.7	1761.0	259.2	193.2	935.2
8	338.5	1327.0	1206.1	1267.8	1993.8	294.1	217.6	1102.6
9	388.4	1511.2	1368.3	1429.8	2282.3	337.4	245.4	1161.2

8 CONSEQUENCES OF OIL REVENUE INFLOW AND THE OUTLINE OF AN OIL PRODUCTION STRATEGY

INTRODUCTION

The present chapter will be concerned with two basic themes: the side effects that are generated or induced by the inflow of oil rent and the outline of an oil production strategy.

Our basic argument that it is vital for an underdeveloped oil exporting country to establish strict control over the oil revenues it receives will be elaborated further here. The inflow of oil revenues, we shall argue, is not without cost in the sense that the extraction of an oil barrel today only leaves that much less that can be extracted in the future. Within such an economic setting as that prevailing in almost all of the OPEC countries, the inflow of oil revenues in excess to what can be rationally utilized tends to produce certain economic and sociological effects, and to provoke a particular type of expansion. These effects may prove to be extremely harmful in the long-run, giving rise to further obstacles to the society and its goal of establishing a self-sustained, highly advanced and independent economy. In the discussion of these aspects, reference will be made on occasion to other oil countries than Iraq, for, although the issues under discussion here are of a general nature, the consequences may be more apparent and severe in some of the oil countries than in others.

Thereafter, we will proceed to present the outlines of our suggestion for an oil production strategy. This proposal is the outcome of our study as a whole and the reasoning behind it can be traced in the chapters presented earlier. Although our oil production strategy was originally outlined with the economy of Iraq in mind, it has proven to be necessary to put this proposition in a wider context, that of OPEC in general.

8.1 CONSEQUENCES OF OIL REVENUE INFLOW

The basic characteristics of an oil economy, that of Iraq, were presented in some detail earlier in this study. These include the one-sidedness of the economy with respect to the financing of the GDP and the NI as well as of the foreign exchange earning. Yet the crude oil sector is severely disinte-

grated from the rest of the local economy. This paradox has resulted in a peculiar form of economic dependency, a dependency which is confined to the expenditure side and almost non-existent in the inter-sectoral or inter-industrial relations. The oil revenues finance the largest portion of the government's development and current budgets, and the effects of the oil industry itself can hardly be seen on any other economic index. The strict enclave nature of the crude oil sector limits the effects of any increase in the GDP due from oil to the final demand item in the input-output matrix of the economy. On the other hand, the sectoral distribution of the labor force bears no proportional relation to the sectoral values added. The country is failing systematically to invest as much funds as allocated in the development budgets, investment priorities are shifting in favor of the service sectors and the response of the major sectors in the economy, i.e. agriculture and industry, is far from satisfactory.

Although these basic characteristics were deduced by reviewing the Iraqi data, they probably can be generalized to all the other major oil exporting countries. There may be differences in the degree of severity (Iraq seems to be among the better-off), but not in the presence of the characteristics themselves. Our interest here is to go behind the surface of these characteristics and attempt to trace the mechanisms which give rise to them. To facilitate the exposition, we will divide our attention between the economic and the socio-political consequences of oil-rent inflow, bearing in mind at the same time that these are closely interrelated and cannot be separated in real life.

8.1.1 ECONOMIC CONSEQUENCES

A basic dilemma of the oil economies is that they have more resources for consumption and investment than what they themselves actually "produce". In the society as a whole, an enormous discrepancy can be seen between the efforts it expends and the returns it receives. This point can be demonstrated explicitly, for in all of the oil economies, the increase in the GDP bears hardly any realistic relation to the increase in the capital formation during the same period.¹ This is not due to any extraordinary increase in productivity. The reasons are two-fold and both are related to the oil sector. The first concerns the technical nature of the oil industry: although the incremental capital/output ratio is very high in the early stages of the oil extraction industry, it is quite low in the later stages. The oil output can be increased up to some point with relatively little extra investment. The

second reason, and the more significant, refers to the increase in oil prices and the improvements made in dividing up the oil surplus to the interest of the producing countries. These measures could of course increase the oil value added without incurring a corresponding increase in investment.

The situation of the oil exporting countries was unprecedented: the sudden huge inflow of money to extremely poor, isolated and backward societies. The oil-based economies were in obvious need of almost everything and suddenly money became plentiful. It was thought then that nothing could prevent them from making an unprecedented rapid development, and it took some time before the picture clarified and the serious hinders to a meaningful development in these countries began to show up. The point was not completely unfamiliar to economists: regardless of how important it is, capital is only one factor among many which determine the very complicated process of development. When a structurally defective economy gets access to an unlimited supply of funds, mere quantitative expansion serves to make these defects even more severe. The more money is pumped into the economy, the more the other sectors become passive and dependent on the "easy" source of finance. The more the shadow price of the foreign exchange becomes lower, the more will imports be favored and more severe will be the dependency of the country on foreign markets. The relative ease with which resources can be made available seems to lead to an inevitable underestimation of the vital need to raise production and productivity, to diversify and increase exports and to tap other sources in addition to oil to finance government budgets.

Yet, more money kept flowing in and the pressure for allocating an increasing share of it for investment purposes kept mounting. The people's expectations of quick and immediate prosperity had to be satisfied in some way, even if it meant redefining "development" to mean only "more consumption."

The governments were confronted with a strictly limited absorptive capacity (see chapter 6) and were perhaps unwilling or unable to identify the real bottlenecks in the economy and undertake the sacrifices necessary for solving them. They managed however to find a way out of this dilemma. Historically the oil governments succeeded in defusing the oil revenues via three major outlets: expansion in the public services, especially in public employment, expansion in high-prestige construction projects, granting gifts and various other forms of throw-away spending, and finally, expansion in military expenditure and investment abroad. All these outlets are relatively open, are within the reach of the government and can satisfy some of the expectations of the people and nourish the tendency to show-off.

With the passage of time, however, the access to these forms of "easy" expenditure outlets proved to be not without its price. The nature of these outlets, along with the geographical concentration of the government apparatus intensified more than ever the gap between the rural and urban areas. The development of the cities was of a peculiar nature, characterized mainly by a large governmental apparatus through which a certain share of the oil rent is pumped and a slide of speculators, wholesalers, import agents, bankers and contractors - in short, cities with a huge service sector but without a productive basis.² Polluted (in all senses of the word) as they are, these types of cities have an irresistible attraction to the inhabitants of the rural or remote areas. The extraordinary internal migration to the cities is not surprising.³ In those oil countries which used to have a sizable agricultural or fishing sector, the decline in production and productivity led, in spite of the migration, to an intensification of the extreme imbalance in the economy. In other oil countries the traditional sectors, which just a few decades ago had provided the livelihood of the country, vanished altogether.⁴

The vast expansion in public services was, and still is, one of the major outlets for the oil revenues. Of course, the basic public services are needed and should be provided on a large scale. The point is that in many cases, the expansion in public services is used to hide specific defects in the system and postpone their solution. For example, education has undergone a great "boom"⁵ in most of the oil countries. This can be seen from the size of the education budgets, the number of schools and of students at all levels. But the horizontal expansion of education was, to some extent, the result of the oil-rent inflow rather than in reflection of actual needs of the economy. In non-oil countries this would have resulted in vast unemployment and/or in a brain drain. In the rentier countries the system is able to provide a shelter, thanks to the oil revenues. The government institutions are providing an endless number of disguised employment opportunities. The number of public employees in Saudi Arabia increased by 120% between 1965 and 1969. In 1967, more than 30% of all those having jobs in the Kingdom, excluding the police and the army, were employed by the state. In the early 1970's, one of every six Kuwaiti was on the government payroll.⁶ Between 1945 and 1957, the government net employment in Iraq (excluding the army) increased by less than 5000 persons a year on the average. The figure rose to 16,750 annually during the following ten years, and more than doubled in the four years after that.⁷

The use of employment in the government apparatus as a means of "hiding" unemployment in Iraq can be clearly seen in law no. 103 of 1974, which stated that all unemployed university and high school graduates were to be given jobs in the various government institutions. Some 14,000 applications were submitted and apparently accepted and distributed on a percentage basis throughout the different sections of the public apparatus. A similar decree was issued the following year for the benefit of the new graduates.⁸

An extraordinary expansive trend in construction activities can also be seen in all of the oil-rent receiving countries. This refers both to construction in general and to the building of residential and commercial houses in particular. It may well be argued that the construction of a basic infrastructure is a precondition for any well-founded development strategy. Furthermore, it is necessary in order to alleviate immediate bottlenecks in the distribution sectors. But the extraordinarily high priority given to the construction sector, its relatively high execution ratio, the extreme luxury which characterises most of these projects as well as the lack of urgency for many of them indicate that the concentration on this sector is serving other purposes. The fact that these projects require little maintenance and follow-up, that they, more often than not, can be executed by foreign contractors on the so-called "turn-key" basis, and that they give an impression of rapid change and growth may be some of the reasons behind the construction boom.⁹

The tremendous expansion in construction and building works in a few main centers in the oil countries promoted land speculation far exceeding any reasonable limit. For the more sophisticated projects requiring qualified personnel to run and maintain them, the foreign companies which had delivered them in complete form also carried out these functions. Since there is a lack of long-term planning, the foreign companies are required to deliver the projects in as short time as possible. This, along with problems of shortages in local resources, has resulted in greatly overestimated costs. Historically, in various parts of the world, the execution of major construction works provided the opportunity for training the local working force and supplying it with qualifications that could be carried over to other sectors, and facilitated the growth and expansion of other sectors of the economy. The fact that the construction projects in the oil countries are largely carried out by foreign contractors, often with the help of a foreign labor force, results in the loss of this great opportunity to "school" the local labor force. Also, looking at the particular nature and type of construction activities favored in the oil countries, the projects seem to be an end in themselves rather than a means for promoting other activities and increasing production and productivity in other sectors.

The diffusion of rent in the local market in the form of "gifts" is still another characteristic of the rentier states. In recent years this system of gift-giving has been organized under different forms of social security which, with the exception of Iraq, are strictly confined to native citizens rather than to Arabs residing in the country. It is still true today, however, that members of the extremely large royal families and the heads of tribes in a number of oil countries receive huge amounts of money in the form of monthly payments, in return for doing practically nothing. The gift payments take different forms in the different countries. In Kuwait, for example, prior to the mid 1960's, land would be bought from individuals at an excessively high price and then re-sold, often to the same individuals, at a very low price. It was estimated that some \$ 1.7 billion was diffused locally through this system.¹⁰

In some of the oil countries, the various forms of local expenditure absorb only a share of the oil revenues. The rest is often used to finance the purchase of military equipment or is invested abroad. In some instances, the military expenditure is justified for reasons of national security, but in many other instances it is incomprehensible. Many of these weapons may not have been bought had oil revenues not been available. It has also been estimated that, in 1974, the nine OAPC members had invested \$ 57 billion in the Western countries. Some 57% of this amount was invested in the UK and the USA alone. About half of the sum was placed in bank deposits, and some 16% in government bonds.¹¹

These various outlets for oil revenue seem to have been induced by the availability of funds on the one hand, and the limited absorptive capacity of the oil-based economies on the other. The outlets were readily attainable for the governments concerned and provided some temporary satisfaction. It is doubtful, however, whether these outlets will remain so open in the future as they have in the past. More importantly, it is highly doubtful whether the access and extensive reliance on these forms of "easy" expenditure will bring the countries any closer to fulfilling their goal of a developed, self-sustained and independent economy. On the contrary, the easy expenditure policy may impose direct and indirect limitations on the local economy which will further hinder the society from achieving its goals.

It is interesting to point out in this context that this expenditure policy reflects the wasteful tendencies also noted in the aid-receiving countries. The efficient use of capital seems to require the same abilities and insti-

tutions as are needed for accumulating it.¹² In that sense, the need to accumulate capital (i.e. to save from the non-oil revenues) should not be understood as being merely for the purpose of making funds available to investment.

The vast increase in local demand in general and in the demand for consumer goods in particular which was partly a result of the government's "generous" policies, gave rise to an unprecedented increase in imports in all of the oil countries (e.g. in Saudi Arabia 300% annually during the years 1971 to 1976). Severe inflationary pressure due to the failure of the local non-oil productive capacity to expand, the sudden great expansion of "wealth", sharp imperfections in the local markets and the lack of any protection against external effects were just as remarkable. It seems that the very nature of the oil countries makes them candidates for excessive inflationary pressure.¹³ The governments' expenditure practice makes the problem even worse. That policy along with inflationary pressure results in shifting all of the resource costs from their true social costs. Such shifts, along with the reduced relative price of imports due to the availability of foreign currency, naturally favors import trade over local manufacture and especially import substitution. The non-importable services will in their turn tend to attract manpower, especially the talented people, pulling them out of the commodity sectors such as agriculture and manufacturing.

8.1.2 SOCIO-POLITICAL CONSEQUENCES

One of the most interesting characteristics of the oil countries is the fact that the government seems to function as an independent hierarchy, cut-off almost completely from the national productive base in which nearly all of the population is engaged. Contrary to the usual state of affairs, the rest of the national economy lives off what the oil-rentier governments bring in, rather than vice versa. It has been suggested that the oil economies are better able than other countries to tolerate an uneven distribution of income, since exploitation is mainly directed here towards nature rather than towards the people.¹⁴ This may be true, but only to a certain extent. The expectations of the people in receiving a certain share of the wealth (which to them has originally been given by God) should not be underestimated. The historical experience of both Iraq and Iran has shown that unless a well-founded net exists for transforming a part of the oil rent to meet the expectations of as wide a public as possible, the system as a whole would be exposed to a real threat. In other words, unless a wide slice of the population is made directly interested in preserving the inflow of oil rent, the possibility of drastic

radical changes cannot be excluded. The fact that the powerful ruling elite can be easily disarmed once it loses control over the rent flow makes the chance of successful social change even greater.

There are a variety of alternatives for establishing the oil money distribution net in the short-run. The systematic practice of gift-giving mentioned above is one way to fulfill this function. In the long-run, however, things will be more difficult. Sooner or later the tribal form of relations must relinquish its place to a new type of social order justified by new prevailing conditions. The huge sums of money granted directly to some parts of the population, the endless facilities and allowances granted to local businessmen and the different forms of subsidies provided to people in general (public employment, health securities, housing allowances, a tax-free economy), all bring about great concentrations of wealth and will certainly cause substantial changes in the old relations and setting. High-ranking government employees and members of the ruling elite, having access to public contracts and the right connections with the right people, have an open path toward the establishment of big business. However difficult to identify and define, a new class is nevertheless emerging. Its members make fortunes by re-selling public contracts to foreign companies and by trading and speculation activities, but only marginally from productive investment. In recent years this class has shown great interest in financial and banking activities, both at home and abroad.¹⁵

It is also interesting to note another dilemma which some of the oil countries are facing. This concerns the vital role the governments are forced to play in the life of the economy as rent collectors and diffusers on the one hand, and their lack of an ideology, or rather the adoption of an ideology that severely opposes any role of the government in economic life on the other. The present fantastic boom in construction in the Gulf area is but one way of trying to circumlocute this problem. Also the policy of financing projects for individuals almost without expecting or asking for a return, serves the same aim.

One could elaborate at length about the socio-cultural consequences of the inflow of oil revenue. However, only two major phenomena having direct economic implications will be presented here: the rapid change in consumption size and pattern and the attitude to work.

The vast expansion of imports seems to be just the other side of the coin of the tremendous increase in consumption and the failure of local produc-

tive capacity to expand to any comparable degree. Even if it bears no relation to production (other than crude oil), the increase in consumption is taken as a sign of "prosperity"- for modernization and development are interpreted as "more consumption". Nowhere in history has the world witnessed an expansion of consumption such as that which has taken place in the oil countries.¹⁶ This is equally true with respect to the shifts in the consumption pattern. The effects of sudden wealth on the exceptionally poor, isolated and autonomous Beduin societies proved to be stronger than their cultural conservatism in changing their consumption patterns and level.

With the quantitative and qualitative consumption explosion, the oil countries, more than any other underdeveloped country, developed a new form of dependency on external markets, a form which may prove to be more dangerous than the previous one. It may be argued, however, that contrary to other underdeveloped states, the oil countries are not confronted with the problem of deciding on an adequate balance between immediate and future consumption; that the oil countries, in other words, are not in need of forced saving measures, but rather are able to save without any corresponding reduction in immediate consumption. But this may prove to be poor advice. The prevailing consumption patterns will certainly affect a country's general investment and development policy. Also, consumption may reach such a high level that it would be almost impossible to satisfy the demand after the oil era. The new consumption patterns will be very resistant to any changes later and will be difficult to satisfy from the local productive basis, just as it will be difficult to establish the export industries needed to finance continuous importation.

The peculiar nature of the oil economies gives rise to other types of serious social questions. In the same manner as the government collects its oil rent with hardly any effort, individuals also demand their income. There is a special relation in rentier countries between the government and the individual. The former can secure its revenues in complete independence of the latter. Nevertheless, individuals have a very high cost-free expectation from the government. The rentier countries experience an income level and consumption patterns which, although comparable to that prevailing in most of the industrialized countries, exist side-by-side with Beduin nomadic norms and relations. The consequences of this paradox may be serious as well as ironic. Manual labor is avoided as far as possible by Beduins, but jobs like guards, caretakers, office clerks and car drivers are strongly favored.¹⁷ Tribal and family relations and considerations are still far stronger than nationhood and

class relations. Attitudes to time, law, labor and employment relations, status of women, etc, are still Beduin in essence. Kings and rulers are closer in kind to the tribal sheikhs than to modern government managers and civil servants. Thus the wealth of the country is treated more as private wealth belonging to the rulers, with some pressure on them to share a part of it with the members of the tribe. A tribesman does not feel that he is asking for charity when he demands money for services he has not rendered. He is simply asking for his share of the wealth of the tribe.

These norms are certainly undergoing change, but not necessarily towards the better. It is the more positive elements of the Beduin culture - the sense of collectiveness, honesty and hospitality, for example - that are the first to decline. The richest and most dynamic sectors of the population impose their new norms created by the nature of their activities, norms which emphasize easy, fast and enormous gains achieved through speculation, cleverness, having the right connections, corruption and monopoly trade agreements.

8.2 AN OIL PRODUCTION STRATEGY

It may be argued, and it is probably true, that the consequences referred to in the previous section are the result of the limited absorptive capacities of the oil economies, or that they are the direct result of the particular expenditure policies adopted by the oil governments. Our point remains valid however: whether due to the absorption limits or to the various pressures on the governments, once oil revenue becomes available in an abundant quantity relative to the "needs" of the economy, it will tend to be spent via certain outlets which make the defects of the oil economy even more severe.

The negative economic and socio-political consequences of the oil-rent inflow provide the second basic argument we have introduced in the study for the need to establish firm control over the inflowing oil revenues. The first argument is that the country concerned must undertake a more meaningful development planning effort in order to achieve its strategic goals. Our evaluation of the development planning experience in Iraq (chapter 4) has shown clearly that the implicit assumption that the economy is able to invest as much funds as a certain share of the oil revenue can make available has turned out to be one of the main constraints on planning efforts. It confuses the whole planning process, shifting the sectoral investment priorities and resulting in an increase in the dependency on oil revenues. The systematic

failure to utilize as much funds as allocated in the plans, in spite of the fact that certain "easy" outlets managed to absorb far more than their share, was taken as an accidental event rather than as a structural phenomenon reflecting the strictly limited ability of the economy to absorb productive investment. The economic planning technique was, therefore, aimed at investing as much oil funds as could be made available, rather than making available as much funds as was needed, from various sources, in order to acquire a certain growth rate and bring about specific structural shifts that would be in agreement both with the absorptive capacity limits and the country's strategic goals.

Oil revenue is certainly not needed only for investment purposes in the oil countries. Oil revenues are needed to pay for four different forms of expenditure: 1) internal investment, 2) consumption and current expenditure, 3) Arab and international obligations and 4) a residual item which we shall call the "strategic fund".

The share of oil revenue that finances investment and consumption should be treated as residual in nature. I.e. oil revenues should fill the gap between the size of investment as determined by the absorptive capacity and the non-oil revenues that can be allocated to this end. Also, oil revenues may be used to ensure that consumption will grow above a certain minimum, if this cannot be secured by the non-oil resources alone. The illustrative model presented in the previous chapter exhibits the possibilities of determining the oil production volumes with reference to these two items.

The third item above, i.e. international obligations, includes all aid, loans and direct investment abroad either through international agencies or directly in other underdeveloped countries. Such an item is designed to compensate for the oil imports of underdeveloped countries and to fulfill the national obligations of the Arab oil countries towards other poorer Arab countries. Several reasons can be mentioned for justifying the need for strategic funds. It can assure a better balance between need and revenues, since any shortages can be withdrawn from it and any surplus can be added. The fund's resources can be considered as a reserve to pay for any unforeseen need or to face possible foreign threat. In such case, most of the fund's assets should be relatively liquid and firmly under national control. The size of the last two items above seems to be subject more to political considerations than to pure economic factors. At any rate, each can represent a certain flexible ratio of appropriate indices.

The third argument we advanced in the study for advocating the need to establish a firm control over the quantity of oil produced in the individual oil countries refers to the state of the international oil market and the bargaining position of OPEC. The vital need of OPEC to regulate the quantity of oil it exports to the world market if it is to maintain its price-leading position is obvious. Furthermore, it is just as obvious that without advancing specific criteria for allocating a specific size of oil output among its various members, it is difficult to see how OPEC can impose its control over the quantity produced and exported.

The oil prices have almost never been determined in a competitive manner in the world market. Up to 1960, oil prices were solely determined by the international oil companies, although they were affected to a certain extent by consumer pressures.¹⁹ Around that year, OPEC was able to impose a certain minimum on the price, as far as the calculation of its share of the profit was concerned. By the early 1970's, OPEC was able to determine the oil price on the basis of what it considered to be a "fair" and "possible" price. There are well-defined reasons why OPEC was able, first in the mid 1970's, to capture the position of oil-price determinator and to raise it to such high levels.²⁰ But it is probably difficult, if at all possible, to supply an economic basis to explain the specific level of oil prices before, during or after the 1971 to 1973 period.

The present world market is openly governed by three coalitions: OPEC representing the owners, IEA representing the major consumers and the multi-national oil companies representing the operators. Each of these parties had for some time and within certain limits, the upper hand in dictating the oil prices. The bargaining power of the different parties, the intersecting interests of some of them and the whole international setting and political considerations largely determined the margin between oil cost and market price as well as the distribution of this margin among the three parties concerned.²¹

OPEC was able so far to ask for the price it considered "fair" and "possible" without paying hardly any attention to the quantity produced. This state of affairs may well be possible in the short-run and in the peculiar market situation which has characterized the crude oil market during the past decade, but it certainly cannot last. Without the regulation of the quantities exported, OPEC will be forced sooner or later to give up its privilege of determining the price. For, of course, for every price it considers "fair" and "possible" at any given time, there corresponds a specific output to be produced.

The above discussion indicates two important observations: on the one hand, the oil countries may be better off if they receive just as much oil revenue as is warranted by their internal "need" for achieving their strategic goals. On the other hand, OPEC ought to produce a certain specific quantity of oil if it is to acquire and maintain a certain price for its oil. If these two quantities (i.e. the sum of output required of the OPEC countries to satisfy their various "needs" and the total quantity that OPEC should produce in order to acquire and maintain a certain oil price) turned out to be comparable, theoretically there would be no problem on the aggregate level. However, within present conditions, it seems more likely that OPEC ought to produce more oil than the actual need of its member countries for oil revenues dictates. The picture is complicated further by the fact that the oil reserves are not distributed evenly among OPEC members. On the contrary, it seems that the countries with the apparently lowest absorptive capacity possess the largest oil reserves.²² In other words, within the context of our proposition for an oil production strategy, there exists two possible situations that cannot be excluded. 1) Even if the sum of the total oil output required by the individual OPEC countries to meet their needs matches with the total output that OPEC ought to produce in order to maintain a certain oil price, the distribution pattern of the output according to the need among the various members may differ substantially from the pattern prevailing at present. 2) The sum of oil output required in order to satisfy the need in the various OPEC countries may be larger or smaller than the total output that OPEC ought to produce in order to maintain a certain oil price.

Once we introduce the time preference alongside of the absorptive capacity concept, it will become clear that the more severe the absorption limit is, the lower will be the discount rate of future benefit. In that sense, the countries with a strictly limited absorptive capacity should be rather indifferent towards allowing those countries having a higher absorption to produce their oil first, i.e. to allow them to extract more oil than their due share in accordance with the reserves. In this way, each OPEC member will extract oil in accordance with its "need" for oil revenues and up to the point allowed by the appropriate exploitation methods and norms.²³ Any oil output required beyond that could be allocated among various members in accordance with the size of the reserve, or some such similar criterion. The extra funds earned from producing this extra output must be identified strictly as "surplus". In a certain manner, it is a revenue from extracting oil earlier than the due time, as a result of certain circumstances. The opposite situation, where the total quantity of oil to be produced in order to satisfy the need is

larger than that required to satisfy the demand at a given oil price seems a remote possibility at present. A reduction in the oil revenues allocated to consumption ends and a withdrawal from the "strategic fund" may be applied in such cases, however. A certain reduction in the oil price, if it will result in increasing the output and the revenues, may also be considered.

The proposed oil production strategy, whether for OPEC as a whole or for its individual members, is perhaps too optimistic. A number of prerequisites must exist before such a strategy can become possible at all. Most important is a mutual understanding among the policy-makers in all of the OPEC countries concerning the way oil revenues should be utilized and what type of development they should bring about. It may be argued that such a production strategy would place heavy burdens on some of the countries within OPEC. But this would still be to their benefit, if a truly developed, independent and productive society is their end.

CONCLUDING REMARKS

The oil rent received by the oil exporting countries has been the major determinant of the political economy in these states. During the last few decades, the oil countries have been going through an unprecedented change. But although their integration in the world market has been occurring at an extraordinary pace, it still cannot be claimed that "capitalist relations" have infiltrated these countries to any appreciable extent. With the exception of a few of the oil countries, the sheikh/tribesman type of relation remains essentially the same as before the oil era. It seems to be true that once that form of relation is supported by the inflow of huge amounts of rent, it shows a great resistance to change.

In other oil countries, such as Iraq, the sheikh/tribesman relation was partly transformed during the first half of the present century into a landlord/peasant type of relation. With the aid of successive legislation, the feudal type of relation gained ground over the previous pattern. There was nearly no struggle for hegemony, but rather a smooth transformation of the upper parts of the tribal societies into landlords and a further transformation of those landlords towards comprador activities in the urban centers. Since it was at the centers that the government was pumping out the rent and it was there that the government apparatus was expanding enormously, wholesale trading, import agencies and land speculation became quite attractive activities. What

proved to be more important, however, was the new expanding middle class which was interested in issues of politics and social justice and which contained the most powerful and about the only highly organized part of the society: the army.

The way in which the oil rent was defused and dispersed from the center, the nature of the development projects adopted and the brutality of the landlords made the already severely uneven distribution of income even worse. The dispersed rent was reaching no further than to a limited section of the society. This state of affairs resulted in an intolerable situation which the middle class and the army, did not fail in 1958 to take advantage of. And contrary to what happened in other countries, neither the resistance of the old ruling élite nor the need of the new rulers for its cooperation proved to be of any significance. The control over the inflowing oil rent was all that was needed.

The Iraqi, and perhaps Iranian, lesson becomes evident. Rent inflow could be more a source of discontent than of comfort unless a well-established network exists to transfer at least a part of this rent to as wide a public as possible to make the people directly interested in preserving the rent inflow. In some oil countries, the tribal relations provided such a network for distribution. It proved to be efficient and successful, but this may be only on the short-run. As slow as it may be, a new type of relation warranted by the new circumstances is developing in these countries. The practice we have witnessed of providing endless forms of subsidies and various types of social benefits to the citizens in the oil countries is one sign of the new trends.

For our purposes, however, these observations shed light on the type of pressure that the oil governments are subjected to from within. Individuals have very high expectations from the government, and expect these to be fulfilled without cost. It seems that the more oil rent the government receives and the more certain social groups enjoy the benefits, the higher are the expectations of the people for receiving their "share" directly. But the manner in which these expectations are being satisfied have very damaging consequences for the economy. It accelerates even further the severity of certain bottlenecks in the economy, especially with respect to human capital.

The government, on the other hand, being confronted with a strictly limited absorptive capacity, tends to rely on other "easy" outlets for spending a large portion of the oil rent it receives. The economic consequences resulting from such an expenditure policy raise further obstacles to the

society and its goal of bringing about a self-sustained, productive and independent economy.

The "easy" expenditure policy is most likely provoked by the fact that the oil countries are receiving far more oil revenue than is rationally warranted by their "need" and by the long-run economic targets. There is certainly nothing wrong with the people having high expectations of their government. The mistake is in the type and cost of these expectations. The various types of expenditure outlets seem to have been evaluated with respect to their immediate effects, a fact which has certainly helped the government to "solve" some of its immediate problems. But if the more long-run aspects of these outlets for expenditure are considered, the advantages may vanish. By suggesting a strict control over the inflowing oil revenues, it is meant that the government's expenditure policy should refrain from the tendency to squander and should restrict the false, unrealistic and harmful expectations of the people for getting benefits without making any productive efforts.

It is in this context that our proposition for establishing a certain degree of correlation between the "need" of the oil economies for oil revenues and the oil production program it adopts can be understood. The strict control over the inflowing oil rent would seem to be necessary in order to confine the development budget to the limit permitted by the absorptive capacity, to evaluate the long-term effects of the various expenditure outlets and measures, to plan for the decrease of dependency on oil revenues and to tap other resources than oil for financing investment and the current budgets and for providing a tool to stabilize the economic activity. The adoption of a production strategy based on "need" is no less important for protecting the bargaining position which is held so far by OPEC in the world oil market. It is possible to elaborate on how such a production criterion could be used as an allocation criterion within OPEC as a whole. This may imply that the countries with larger reserves and lower absorptive capacity would have to reduce their output for the benefit of the other oil countries having the opposite position. The necessary cut in the output of some of the oil countries, considered perhaps by some as being a heavy sacrifice, is nevertheless, according to our analysis, to their benefit as well.

NOTES

1. Even before the world oil-price explosions, the aggregate capital/output ratio in Iraq was declining drastically. I.e. the GDP (and GNP) was increasing at a far higher rate than the gross domestic investment. Between 1953 and 1971, the index number of the GDP rose from 100 to 433, at a time when the gross domestic investment only rose to 239. An analogous comparison for the period following 1972 should produce somewhat absorbed figures for all the oil countries.
2. Storck quoted an Iraqi Chamber of Commerce report estimating that the number of retail firms had risen from 36,000 in 1965 to about 100,000 in 1973. Storck (1980), p 192.
3. An economic advisor to the IPC, Kinch (1957), noted that the type of construction projects carried out in Iraq during the 1950's made life even harder for the poor, because of the resulting demand-pull inflationary effects. He also noted that the vast migration to the cities is explained by the concentration of wealth and job opportunities existing in the centers. "The peasant with minimum means of survival does not migrate", he wrote. And further: "In a country with a large indigent community it (internal migration) must necessarily be the effect of a sudden accession to wealth".
It was estimated that in Iraq at the end of the 1960's, migration to the cities had reached a rate of 57,000 persons per year.
4. In Kuwait, for example, it is only in museums that one can see the traces of the fishing and pearl-fishing tradition that had been the only source of livelihood in that country just a few decades ago. In some of the other oil countries, not even this much of its traditions has been preserved. C f Amin (1974).
5. C f shaw (1981).
The educational system grew in extent, but not in content. The system still retains its pre-independence aims of providing semi-educated personnel to fill jobs in the public services. It reflects a general lack of respect for manual labor. The expansion of the primary and secondary schools took place at the expense of vocational training education. In Iraq the ratio of technical school students to secondary school students fell from 21% to 4% between 1957 and 1967. Also, while only 2% of the total expenditure on education was allocated to technical schools in 1966, as much as 12% was allocated to universities during the same period. UN-Studies (1970), pp 79-84. Illiteracy rates remain high in all the oil countries. In the early 1970's, it was 45% in Kuwait, 61% in Libya and 69% in Saudi Arabia. The rate of students dropping out before receiving their primary certificate was also high during that period: 33% in Iraq and 23% in Saudi Arabia, for example. See Shaw (1981), p 639 and 643.
6. Amin (1974), p 84.
Government employment is not limited, however, to educated persons. In 1976, some 22% of the government employees in Iraq were illiterate. AAS (1976). But it is also true that government employment is one tool for absorbing primarily the educated portion of the population. The oil countries are also suffering from the brain-drain problem, but for other reasons than the lack of employment opportunities. It was estimated that during the period from 1972 to 1976, about 11,750 persons emigrated to the USA from the oil-rich countries. 12.5% of them were in the technical, professional and kindred categories. See Shaw (1981), p 646.

7. AAS (1973), pp 399-417.
8. Seers (1964) attempted to give an answer to "the typical paradox of petroleum economy" of the existence of unemployment side by side the presence of high wages. Seers utilized the pre-Keynesian concept of the "wage fund". The rate at which employment increases in the oil economies depends on the difference between the oil export and wage rate trends. Both of these can, therefore, be determinants of employment. As oil export increases, the higher wages of the oil worker provoke the non-oil workers to demand wage increases. This absorbs the increases in the wage fund and leaves no room for increases in employment. This will also favor the adoption of capital-intensive techniques and import at the expense of import-substitution industries, which further accelerates the employment stagnation.
9. The cost of the approved development projects in Saudi Arabia between July 1976 and June 1977 amounted to \$ 11.2 billion, more than 60% of which was classified as services & public facilities and housing projects. The comparable ratio was 99% in Kuwait, 36% in UAE and 45% in Qatar. The ratio of the oil projects in the same scheme for the four countries were 20, 1, 49 and 52% respectively. OAPEC (1977), p 81. See Storck (1980), p 192, for the role played by construction in the Iraqi economy.
10. Amin (1974), p 83.
The Iraqi press report on a procedure frequently practiced by the President whereby gifts are given to various groups of people. The gifts often take the form of sums of money and plots of land for housing purposes. Also, color television sets and refrigerators are common presents to families in certain villages. On the President's first anniversary, 17 decrees were issued to "raise the living standard of the people". Among other things, the monthly wages of all government and public sector workers were raised by ID 15 (ID 25 for the drivers) and ID 25 for other employees. The rise for the officers was even greater. The total monthly cost of these decrees was estimated to be \$ 1500 million. The Deputy Prime Minister called on the people to "spend these increases correctly" and to abstain from the "existing alarming consumption tendency because it is dangerous"! Al-Thawra, July 16, 1980.
11. OAPEC (1977), p 75.
Foreign aid, though large by world standards, absorbed but a minor portion. The aid given by the five oil countries UAE, Iraq, Qatar, Kuwait and Saudi Arabia amounted in 1976 to more than 6% of their aggregate GNP. See also Shihata & Mabro (1979).
12. Cf Amin (1974), p 49.
13. Hagen (1972) concluded that under a certain set of assumptions, three basic "laws" characterize the working mechanism of the oil economies: 1) if no technical progress in the non-petroleum sector is taking place, the relative rates of growth of the money value added of the oil and non-oil sectors will tend towards equality; 2) this holds also for the real value added, and it will be stronger the greater the elasticity of migration from more populated sectors to the richer sectors; 3) finally, unless a labor shift or technical progress can take place in the non-oil sector, the rise in its income will occur only during a process of inflation.
14. Mahdavy (1970), p 438.

15. The severity of this process differs from country to country. It does not exist in some of the oil countries, such as Iraq, Libya and Algeria. The elite in these countries seem determined to stress the political and economic power of the state. The excessive luxury enjoyed by the high-ranking officials is confined to the official post rather than to the persons themselves.
16. Between 1971 and 1976, the imports of the five Arab Gulf oil countries as well as Libya increased by 730% from \$ 3307 m to 27,454 m. OAPEC's share of the total world import rose from 1.9% to 4.4% during the same period. OAPEC (1977), p 72.
17. C f Hottinger (1980), p 24.
Local services in the oil countries are largely provided by foreign workers. The active labor force relative to the population in Saudi Arabia was only 26%. Of this, only 57% were native Saudis. The ratios were 40% and 30% in Kuwait, 27% and 15% in UAE during the early 1970's. It was further estimated that 75% of the foreign labor force in the Gulf countries was non-Arab, Asian and European. See Hayeti (1979), p 131.
18. C f Hashim (1976), pp 19-25.
19. On two different occasions at least, the British Navy and the Energy Department in the Marshall aid program to Europe after the Second World War, were able to exert pressure on the international oil companies and depressed the oil prices. See chapter 2 and Leeman (1962).
20. Among other reasons one could mention the turning of the largest world oil producer into net importer, the successful nationalization measures in Algeria and Iraq, the ability of the Libyan government to dictate negotiation terms with the oil companies, the balance of power prevailing in the world, as well as the political, social and economic development in the Middle East. The October War of 1973 was only a chance for all of these changes to crystallize themselves. C f Anthony (1975).
21. The estimated difference between oil market and production cost price was, in 1950, divided among 11% royalties, 25% profit and 64% taxes. In 1975, the figures were 42%, 9% and 49% respectively. Massarrat (1980), p 52.
22. This will depend, of course, on the particular oil price that OPEC determines, on the development of the world demand for oil and on the internal economic conditions within the OPEC countries in as far as the absorptive capacity is concerned. In Ezzati (1976), and on the bases of an oil barrel price of \$ 11 (in 1973 constant prices), among other assumptions, OPEC was found to have a "stability gap" in 1980. I.e. OPEC's oil output according to its need for revenues was less than the world demand for oil under that price. A few of the oil countries, e.g. Iraq, were found to be in need of producing and exporting more oil in 1980 than their due share of the total OPEC output in accordance with the actual 1974 share pattern.
23. There are well-defined technical and economic conditions that ought to be satisfied in order to ensure the "proper" exploitation of the oil reserves. See for example The Royal Institute (1953) and UN (1962). An example of one of the basic principles in the oil industry is the preservation of the ratio of reserve/current annual output above a certain number of years.

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